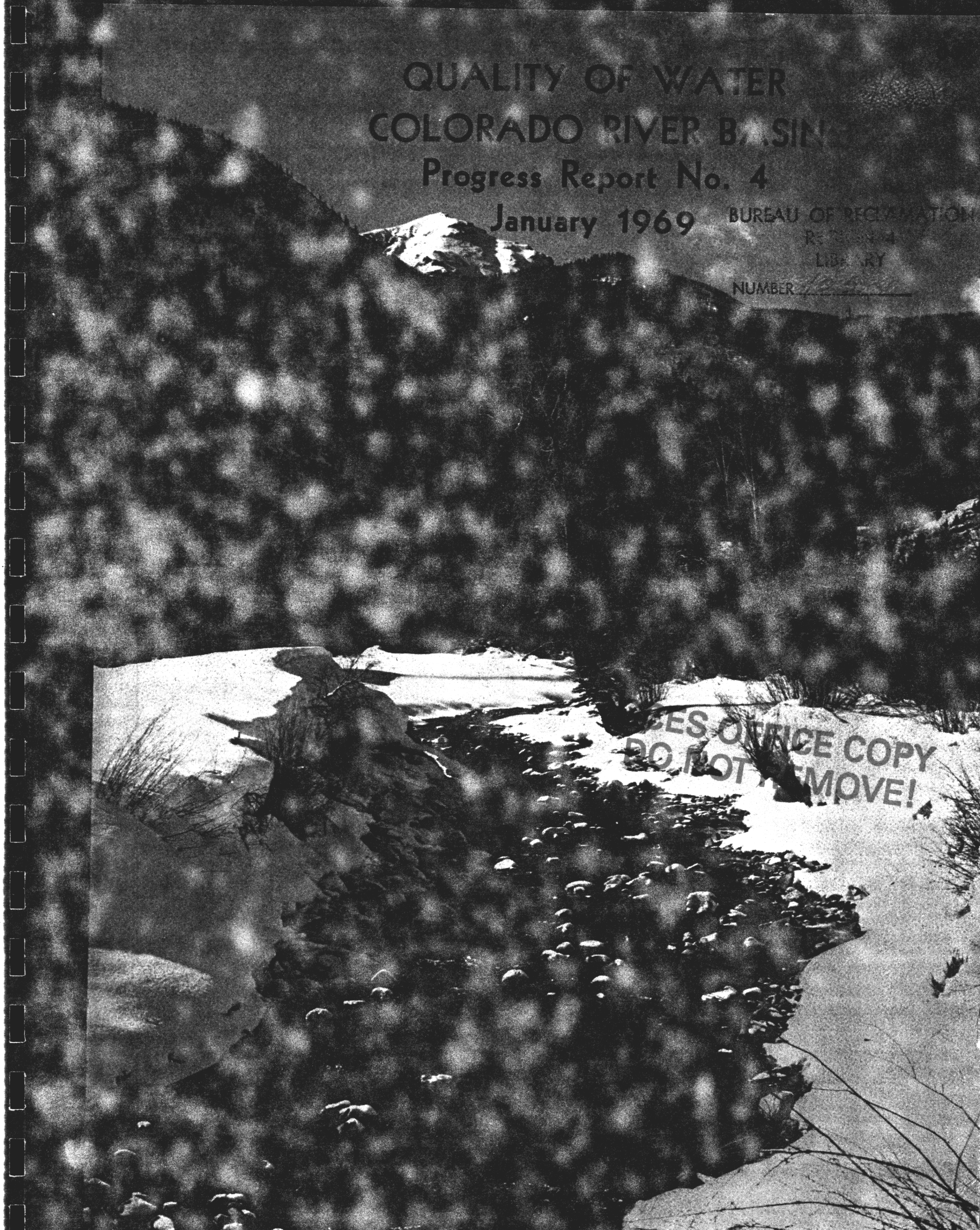
QUALITY OF WATER
COLORADO RIVER BASIN
Progress Report No. 4
January 1969



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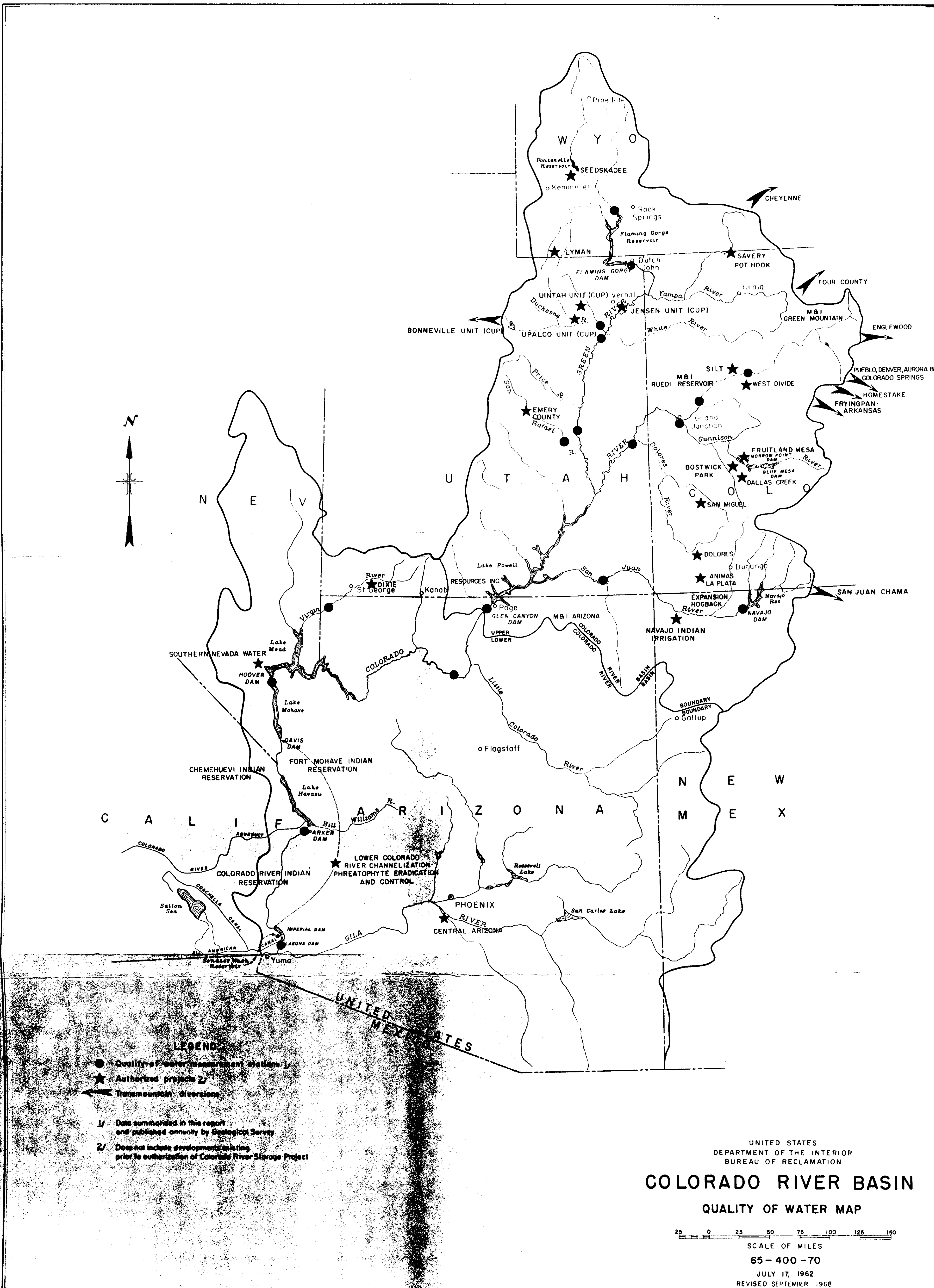
PROGRESS REPORT No. 4

JANUARY 1969

UNITED STATES
DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLORADO RIVER BASIN

QUALITY OF WATER MAP

65-400-70
JULY 17, 1962
REVISED SEPTEMBER 1968

FIGURE I

QUALITY OF WATER
COLORADO RIVER BASIN
PROGRESS REPORT

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QUALITY OF WATER
COLORADO RIVER BASIN
PROGRESS REPORT

SUMMARY

This report presents the past, the present modified, and the expected quality of water of the Colorado River down to Imperial Dam. The past is represented by a tabulation of the recorded or estimated historic condition at 18 quality of water stations for the 1941-66 period. The present modified condition includes adjustments of the historic condition based on the assumption that new developments completed during the 1941-66 period were in operation for the full period. The expected quality condition is an estimate of the quality situation after the presently authorized developments and some projects proposed for authorization are placed in operation. The effects of authorized and proposed developments are presented in five different increments. These effects are primarily related to mineral quality although other quality factors are discussed in the report.

Studies of chemical trends indicate that under historic conditions the average concentration of dissolved solids of the Colorado River at Lees Ferry had about 0.74 ton per acre-foot, below Hoover Dam about 0.94 ton per acre-foot, and at Imperial Dam about 1.02 tons per acre-foot for the 1941-66 period.

Under present modified conditions (that is assuming that the recently constructed projects were in operation for the entire period) the concentrations would have been about 0.80, 1.00, and 1.14 tons per acre-foot, respectively, at the three stations.

It has been assumed for purposes of this study that the rate of pickup of dissolved solids from new irrigated lands would vary from zero to 2 tons per acre. It is also assumed no additional pickup of dissolved solids would occur for lands already under irrigation.

Under the expected condition, with all authorized projects and projects proposed for authorization in operation and with an assumed pickup of 2 tons per acre on the new irrigated lands, the concentrations are estimated to be 1.04 tons per acre-foot at Lees Ferry and 1.33 tons per acre-foot below Hoover Dam. An estimated 1.65 tons per acre-foot would be at Imperial Dam.

The depletions used in this report for the projects, both authorized and proposed for authorization together with present developments and other proposals, are estimated to be the ultimate depletions for the developments listed. Other developments, as yet not identifiable, are expected to occur which will reduce the quantities of water shown for the various stations and cause some changes in concentrations from those indicated in this report.

PART I. INTRODUCTION

A. Legislative Requirements

This is the fourth progress report on Quality of Water in the Colorado River Basin. The directive for preparing this and the three previous reports is contained in three separate Public Laws. The authorizing legislation for the Colorado River Storage Project and participating projects, Public Law 485, 84th Congress, Second Session, was signed by the President on April 11, 1956. Section 15 of that Public Law states, "The Secretary of the Interior is directed to continue studies and make a report to the Congress and to the States of the Colorado River Basin on the quality of water of the Colorado River."

A progress report to comply with Public Law 84-485 was in preparation when the authorizing legislation for the San Juan-Chama Project and the Navajo Indian Irrigation Project (P.L. 87-483) became effective on June 13, 1962. Section 15 of this act states, "The Secretary of the Interior is directed to continue his studies of the quality of water of the Colorado River system, to appraise its suitability for municipal, domestic, and industrial use and for irrigation in the various areas in the United States in which it is used or proposed to be used, to estimate the effect of additional developments involving its storage and use (whether heretofore authorized or contemplated for authorization) on the remaining water available for use in the United States, to study all possible means of improving the quality of such water and of alleviating the ill effects of water of poor quality, and to report the results of his studies and estimates to the Eighty-seventh Congress and every two years thereafter."

A few weeks later Public Law 590, 87th Congress, Second Session, which authorized the Fryingpan-Arkansas Project, was passed, with a similar section pertaining to quality of water reports. This public law, however, stipulated that January 3, 1963, would be the submission date for the initial report and that the reports should be submitted every 2 years thereafter.

B. Previous Reports

The January 1963 report prepared by the Department of the Interior was comprised of two parts: (1) an assessment of the water quality situation in the part of the Colorado River Basin above Lee Ferry, Arizona, as of 1957, prepared by the Geological Survey; and (2) a projection of the water quality effects to be expected from additional developments that involve storage and irrigation use of river waters above Lee Ferry by the Bureau of Reclamation.

INTRODUCTION

The January 1965 report appraised the water quality conditions in the Colorado River Basin above Imperial Dam using the period 1941-61 as a base and included data from two points not considered in the 1963 report. Also, the 1967 report included 3 additional years of record and included suspended sediment data for six stations.

In order to keep each report self-contained, it has been necessary to include some of the text material and tables from these previous reports in this fourth progress report dated January 1969.

Changes occurring since completion of the January 1967 Progress Report include (1) consideration of the Hammond Project under present modified conditions, (2) an average of about 9,000 acre-feet of water now being used by Cheyenne, Wyoming, (3) the addition of another key station, Colorado River near Glenwood Springs, (4) the net future effects of Upper Colorado River Storage Unit operations being limited to evaporation only, (5) elimination of the Marble Canyon Project, (6) addition of the Central Arizona Project by pumping, (7) addition of the Fort Mohave and Chemehuevi Indian lands, and (8) addition of the Colorado River Indian Project. Other additions include 2 more years of record through 1966, discussions of state water quality standards, industrial wastes, municipal problems, temperature data, and salinity control.

C. Cooperation

This report has been prepared chiefly by the Bureau of Reclamation. The Geological Survey provided most of the basic data, prepared the sections of "basic studies" on the lower Colorado River, Flaming Gorge Reservoir, and most of the nonagricultural sources of salinity. A continuing cooperative program between the Bureau of Reclamation and the Survey for the collection of streamflow quality data and the exchange of information has been in effect for a number of years. This cooperation provides for the collection of data at stations other than those normally maintained by the Survey in order to obtain additional data at key points in the basin. The Federal Water Pollution Control Administration who collects samples where needed in areas not covered by the U.S. Geological Survey or Bureau of Reclamation has also reviewed this report. Data collected by the Metropolitan Water District of Southern California have also been included in this report.

Below Hoover Dam, water quality along the main stem of the river is determined by analyzing daily samples taken at key stations. Data obtained above each project diversion and below the return flow from each project show the effect of irrigation on water quality in each section of the river. Data are obtained periodically at various points along the river and in drains in cooperation with the U.S. Geological Survey, the Colorado River Indian Agency, the Metropolitan Water District of Los Angeles, the Imperial Irrigation District, and others.

INTRODUCTION

D. Scope

This report includes information on the quality of water in the Colorado River Basin down to Imperial Dam for the 1941-66 period. The water quality situation below Imperial Dam is covered in the February 1963 report titled, "Special Studies--Delivery of Water to Mexico," prepared by the Department of the Interior, Bureau of Reclamation, Region 3. A description of the then existing projects below Hoover Dam is also included in that report.

Information on sediment loads at several key stations is included to show the effect the storage reservoirs have had in decreasing sediment in the Colorado River.

E. State Standards

Nationwide attention has been focused on water quality in recent years, particularly in the Eastern States where a combination of low runoff and increased pollution has emphasized the problem. The Colorado River thus far has not been polluted by industries to the extent some of the eastern rivers have been; however, the limited supply in the Colorado River has made it necessary that careful attention be given to quality because of extensive uses by agriculture and municipalities.

Since each use entails some alteration of the water, close surveillance of the quality is becoming a necessity. Most quality problems are linked directly with quantity--when the quantity increases, the quality improves. With the increased use of water this situation is reversed and the problem of maintaining the required quality becomes critical.

Because of the critical need for good quality water, the Federal Government has enacted legislation requiring states to establish standards for the interstate streams.

The basic Federal Water Pollution Control Act known as Public Law 84-660 was passed in 1956. Amendments were made in 1961 under Public Law 87-88. In 1965 additional amendments were made in the act now known as the Water Quality Act of 1965 (Public Law 89-234). The most recent amendment was made in 1966. This is known as the Clean Water Restoration Act of 1966 (Public Law 89-753).

Under the Federal Water Pollution Control Act amended by the Water Quality Act of 1965, each state was required (1) to submit by October 2, 1966, a letter of intent that such a state, after public hearings, would before June 30, 1967, adopt water quality criteria applicable to interstate waters or portions thereof within such state and (2) adopt a plan of implementation and enforcement of the adopted criteria. In event the state did not act within the specified time, the Federal Government was empowered to establish such criteria or standards. The standards submitted by the states would be subject to review and approval by the Secretary of the Interior.

The Federal Water Pollution Control Administration prepared a set of guidelines which was designed to interpret the act in such a way that states could proceed to develop standards and plans of implementation which would be acceptable.

The Colorado River Basin States conferees (representatives of the state agency concerned with the health and pollution problems of the state) drafted a special "Guidelines for Formulating Water Quality Standards for the Interstate Waters of the Colorado River System." In drafting this guideline, it was recognized that water quality standards could drastically restrict present and future uses of the Colorado River water under existing compacts. The seven Colorado River Basin States therefore agreed among themselves and recommended to the Secretary of the Interior that specific numerical limits on salinity should not be established in the state standards with regard to the Colorado River and its tributaries until further detailed studies were made which would give a better basis for selection of the limits. This is the present status of the standards within the basin as far as salinity is concerned.

The Secretary of Interior, Stewart Udall, expressed his views concerning the quality of water standards for the Colorado River in his statement of January 30, 1968, to the House Subcommittee on Irrigation and Reclamation (House Document 90-5, Colorado River Basin Project, Part II, p. 705-706). His statement is as follows:

> "The Colorado River is the only major river of the world that is virtually completely controlled. With the existing system of large storage reservoirs it is possible to plan, for all practical purposes, on complete utilization of the river's runoff with no utilizable water escaping to the sea. This means that the limited water supply in the Colorado River Basin must be used and reused and then used again for a wide variety of purposes. In this complete utilization of runoff, the Colorado Basin is unique.
>
> "The River is unique also with respect to the number and extent of the institutional constraints on the division and use of the Basin's water which include an international treaty, two interstate water compacts, Supreme Court decisions, Indian water rights, State water laws, and Federal Law.
>
> "These two aspects, in turn, make the problem of setting numerical mineral quality standards for the Colorado River not only unique but extremely complicated. Before discussing this problem further, I would like to state that salinity

standards will not be established until we have sufficient information to assure that such standards will be equitable, workable, and enforceable.

"The principal water uses in the Basin include irrigated agriculture, municipal and industrial water supply, fish and aquatic life, and recreation. Salinity in the Colorado River has no significant effect on instream or nonconsumptive water uses such as hydroelectric power generation and water-oriented recreation. However, ever-increasing levels of salinity do have an adverse impact on the consumptive uses of water for both irrigated agriculture and municipal and industrial water supply.

"Further development and depletion of water allocated to the Upper Basin States will raise the salinity of water downstream.

"Salinity standards must be so framed that they will not impede the growing economy of the Colorado River Basin and yet not permit unwarranted degradation of water quality. This is the hard dilemma which is the core of the problem of establishing equitable salinity standards.

"A decision not to set salinity standards at this time does not and will not preclude getting started with programs to study and demonstrate the feasibility of controlling and alleviating the Basin's salinity problem. Promising methods of attacking this problem include (1) control of natural sources by such methods as suppression or diversion of mineral springs; (2) control of municipal and industrial wastes by lagooning or injection into deep geological formations; (3) reduction of salt loads from irrigated lands by such measures as rejection of areas of saline soils in new developments, improved irrigation practices, and control of drainage water; (4) alleviation of water losses through reduction of evaporation and evapo-transpiration, and control of phreatophytes; and (5) removal of salts by desalting.

"Water quality also can be improved by measures to increase water supplies such as weather modification and augmentation by desalted sea water which I have previously discussed. These potentials for improving water quality are being explored. The Colorado River Basin Water Quality Control Project of the Federal Water Pollution Control Administration will complete by the end of 1968 a comprehensive report describing the mineral quality of the Basin's waters, delineating the causes of salinity and future increases thereof, assessing the effects of salinity on beneficial water uses and evaluating the economic impact of existing and future mineral quality. The Bureau of Reclamation, for several years, has been giving greater attention to salinity problems as they are related to and influenced by water resources development. Also, the Bureau has just recently embarked on reconnaissance studies to identify possibilities for controlling salinity and to identify specific studies that should be taken to assess control measures at a few select salinity sources. We hope to expand activities of this type in the years ahead, and in this context I can report that we are moving ahead with programs that we expect will lay the foundation for setting workable salinity standards.

"Although the salinity problems of the Colorado River are difficult, I am confident that they can and will be resolved."

PART II. DESCRIPTION OF BASIN

A. Geology

The upper or northern portion of the Colorado River Basin in Wyoming and Colorado is a mountainous plateau 5,000 to 8,000 feet in elevation marked by broad, rolling valleys, deep canyons, and intersecting mountain ranges. Hundreds of peaks in these mountain chains rise to more than 13,000 feet above sea level and many exceed 14,000 feet in elevation. Mountain lakes exist in considerable numbers. The southern portion of the Upper Basin is studded with rugged mountain peaks interspersed with broad, alluvial valleys and rolling plateaus. The main stream and its tributaries in Colorado generally flow in deep mountain canyons. The Green River, primary tributary of the Colorado River, flows in similar canyons in Wyoming, Colorado, and Utah after rising in the Wind River Mountains. The San Juan River, a large tributary, emerges from the mountains of southwestern Colorado, flows through northwestern New Mexico, and then traverses the deep canyons of the San Juan in Utah before joining the Colorado River in Glen Canyon. The Glen Canyon section of the main stream and tributaries lies almost entirely in deep canyons.

Rocks of all ages from those of the Archean age (the oldest known geological period) to the recent alluvial deposits, including igneous, sedimentary, and metamorphic types, are found in the Colorado River Basin. The high Rocky Mountains which dominate the topography of the upper regions are composed of granites, schists, gneisses, lava, and sharply folded sedimentary rocks of limestone, sandstone, and shale. Many periods of deposition, erosion, and upheaval have played a part in the present structure of these mountains.

In contrast to the folded rocks of the mountains which fringe the basin, the plateau country of southwestern Wyoming, eastern Utah, and northern Arizona is composed principally of horizontal strata of sedimentary rocks. Slow but constant elevation of the land area has allowed the Colorado River and its tributaries to cut narrow, deep canyons into the flat-topped mesas. This type of erosion reaches its culmination in the Grand Canyon where the Colorado River has cut through all of the sedimentary rocks down to the oldest Archean granites.

The Lower Basin is characterized by broad, flat valleys separated by low ranges. These valleys are filled by large accumulations of alluvial deposits.

Sediment removed by constant erosion of the upper areas was deposited in Arizona, California, and Mexico and now forms the great delta of the Colorado River.

New reservoirs recently constructed above Lee Ferry (Lake Powell, Flaming Gorge, Fontenelle, Navajo, Morrow Point, and Blue Mesa), together with Lake Mead downstream, have caused some major changes in stream regimen: (1) The stream channels inundated by these reservoirs will no longer be subjected to natural stream erosion, (2) the accumulation of sediment and water within the reservoirs slows the growth and flooding of the Colorado River delta, (3) flooding has diminished in many areas, and (4) sections of sediment-laden streams have given way to clear water streams and lakes.

The mineral concentration in runoff increases from the headwater areas downstream and occurs in relation to the geologic character of the terrain across which the Colorado River and its tributaries flow. The geologic formations that largely contribute to the mineral concentrations in natural runoff are evaporites of Paleozoic age, shale of Cretaceous age, and salt and gypsum of Tertiary age.

B. Soils

The soils of the Colorado River Basin closely resemble the geologic formations of their origin. Only in limited areas at the higher elevations has the precipitation leached the soil mass of its soluble constituents. Over most of the area both residual and transported soils are basic in reaction and well supplied with carbonates with normal or mature soils exhibiting a distinct horizon of carbonate accumulation. The impress of soil-forming factors has resulted in the widespread development of soils classified as members of the Gray-Desert Great Soil Group. In areas with higher rainfall, soils of the Brown and Chestnut Great Soil Groups have developed. Saline and alkali (sodic) soils occur in many parts of the basin.

The residual soils comprise the larger area and are usually shallow in depth over shale and sandstone of various ages. Many of the shales are saline but contain much gypsum as well as other chloride and sulphate salts. Some formations are high in sodium chloride and some have sodium carbonate or bicarbonate strata. Very few residual soil areas are suitable for irrigation development.

The alluvial materials are extremely variable and range from alluvial fans and terraces, outwash plains, to lacustrine sediments. Some areas have soils from material transported only short distances and resemble the original materials. Other areas have soils which have been transported and mixed extremely well. Most of the agricultural areas are on these well-mixed alluviums and, therefore, the soils are quite variable.

Extensive areas of Eolian deposits occur in parts of the basin, principally in southwestern Colorado. The uniformly textured soils are reddish brown in color and have no resemblance to either the underlying formations or adjacent areas. These are excellent agricultural soils, but in many areas topography makes agriculture difficult.

C. Climate

The Colorado River Basin has climatic extremes, ranging between year-round snow cover and heavy precipitation on the high peaks of the Rocky Mountains to desert conditions with very little rain in the southern part of the basin. This wide range of climate is caused by differences in altitude, latitude, and by the configuration of the high mountain ranges. The encircling mountain ranges obstruct and deflect the air masses to such an extent that storm patterns are more erratic than in most other parts of the United States. Most of the moisture for precipitation on the Upper Basin is derived from the Pacific Ocean and the Gulf of Mexico. The Pacific source predominates generally from October through April and the Gulf source during the late spring and early summer.

In the northern part of the basin most precipitation falls in the form of winter snows and spring rains. Summer storms are infrequent but are sometimes of cloudburst intensity in localized areas. In the more arid southern portion the principal rainy season is in the winter months with occasional localized cloudbursts in the summer and fall.

Extremes of temperature in the basin range from 50° F. below zero to 130° F. above zero. The northern portion of the basin is characterized by short, warm summers and long, cold winters, and many mountain areas are blanketed by deep snow all winter. The southern portion of the basin has long, hot summers, practically continuous sunshine, and almost complete absence of freezing temperatures.

Nevertheless, the entire basin is arid except in the extremely high altitudes of the headwaters areas. Rainfall averages as low as 2.5 inches in the southern end of the basin while total precipitation in the high mountains may range from 40 to 60 inches annually.

D. Vegetation

Areas of higher elevation are covered with forests of pine, fir, spruce, and silver-stemmed aspens, broken by small glades and mountain meadows. Pinon and juniper trees, interspersed with scrub oak, mountain mahogany, rabbit brush, bunch grasses, and similar plants grow in the intermediate elevations of the mesa and plateau regions. Large areas in the Upper Basin are dominated by big sagebrush and related vegetation. Many of the streams are bordered by cottonwoods, willows, and salt cedar.

Scattered cottonwoods and chokecherries grow in the canyons with the cliff rose, the redbud, and blue columbine. A profusion of wildflowers carpets many mountain parks. At lower elevations large areas are almost completely devoid of plant life while other sections are sprinkled with desert shrubs, Joshua trees, other Yucca plants, and saguaro cacti, some of the latter giant plants reaching 40 feet in height. Occasionally, cottonwoods or desert willows are found along desert streams with mesquite and creosote bush or catclaw and paloverde. In recent years many river channels have been overrun with tamarisk or salt cedar to the extent that a large volume of water is being consumed by such vegetation. Measures are being taken to curb the growth of phreatophytes to conserve water.

E. Hydrology

The Colorado River begins where peaks rise more than 14,000 feet high in the northwest portion of Colorado's Rocky Mountain National Park, 70 miles northwest of Denver. It meanders southwest for 640 miles through the Upper Basin to Lee Ferry. The Green River, its major tributary, rises in western Wyoming and discharges into the Colorado River in southeastern Utah--730 river miles south of its origin and 220 miles above Lee Ferry. The Green River drains 70 percent more area than the Colorado River above their junction but produces only about three-fourths as much water. The Gunnison and the San Juan are the other principal tributaries of the Upper Colorado River.

The flows of the San Juan River are now controlled by the Navajo Dam, the Green River by Fontenelle and Flaming Gorge Dams, and the Gunnison River by the Curecanti Unit Dams. Glen Canyon Dam is the only major dam on the main stem of the Colorado above Lee Ferry, but it will permit control of almost all flows leaving the the Upper Basin.

The flow at various points in streams in the Colorado River Basin for the 1941-66 period is given in Tables 1 through 18. The records of flow depict the characteristic wide fluctuations from month to month and the considerable variation from year to year. The recently constructed storage reservoirs will now level out some of these fluctuations.

The natural drainage area of the lower Colorado River below Lee Ferry and above Imperial Dam is about 75,100 square miles. This section of the river is now largely controlled by a series of storage and diversion dams starting with Hoover Dam and ending at Imperial Dam.

At the present time there is no significant storage on the main river or on the tributaries between Glen Canyon Dam and Lake Mead. The intervening tributary inflow is erratic but amounts to almost enough to offset the evaporation from Lake Mead.

DESCRIPTION OF BASIN

Lake Mead provides most of the storage and regulation in the Lower Colorado River Basin with the water being stored for irrigation and municipal and industrial uses, generation of electrical power, and other beneficial uses.

Lake Mohave, the reservoir formed by Davis Dam, backs water at high stages about 67 miles upstream to the tailrace of Hoover Powerplant. Storage in Lake Mohave is used for some reregulation of releases from Hoover Dam, for meeting treaty requirements with Mexico, and for developing power head for the production of electrical energy at Davis Powerplant.

The river flows through a natural channel for about 10 miles below Davis Dam at which point the river enters the broad Mohave Valley 33 miles above the upper end of Lake Havasu.

Lake Havasu backs up behind Parker Dam for about 45 miles and covers about 25,000 acres. A forebay was constructed in Lake Havasu from which the Metropolitan Water District of Southern California pumps water into the Colorado River Aqueduct. Lake Havasu also controls floods originating below Davis Dam.

Headgate Rock Dam, Palo Verde Diversion Dam, and Imperial Dam all serve as diversion structures with practically no storage. Imperial Dam, located some 150 miles downstream from Parker Dam, is the major diversion structure to irrigation projects in the Imperial Valley and Yuma areas. It diverts water on the right bank to the All American Canal which delivers water to the Yuma project in Arizona and California and Imperial and Coachella Valleys in California. It diverts on the left bank to the Gila Gravity Main Canal.

The newly constructed Senator Wash Dam also affords regulation in the vicinity of Imperial Dam and assists in the delivery of water to Mexico.

PART III. HISTORY OF DEVELOPMENT

A. Acres Irrigated Prior to Colorado River Storage Project Authorization

A study of the irrigated acreage in the Upper Basin shows that about 800,000 acres were irrigated by 1905. Irrigation development took place gradually from the beginning of settlement about 1860, but was hastened by the purchase of land from the Indians in 1873. Between 1905 and 1920 the development of irrigated land continued at a rapid pace, and by 1920 nearly 1,400,000 acres were irrigated. Then the development leveled off and there has been very little increase since that time. The 1929 and 1939 agriculture censuses show a little over 1,400,000 acres irrigated with the 1949 and 1959 censuses recording a little under that amount.

The lack of further increase in irrigated acreage in the Upper Basin is ascribed to both physical and economic limitations in the availability of water. By 1920 most of the lower cost and more easily constructed developments were in operation, and, although some new developments have taken place since that time, they have been offset by other acreages going out of production.

A large acreage is irrigated in the Lower Basin below Imperial Dam and in the Gila River watershed. Studies of irrigated acreages within the Lower Basin show about 12,000 acres irrigated in Nevada and 23,500 acres in Utah, including 10,000 acres presently irrigated in the Dixie Project area.

Irrigation began in the Palo Verde area in 1879 and was expanded between 1905 and 1908 by construction of an intake structure and gravity canal. A new diversion structure was completed in 1957 allowing the irrigated acreage to be increased. The irrigated area in 1966 reported by the Palo Verde Irrigation District was 86,863 acres.

Irrigation on the Colorado River Indian Reservation was first attempted in 1870, but failure of the headgate structure resulted in flooding sections of the valley. Other difficulties were encountered, and by 1936 only 5,000 acres were actually irrigated. With completion of a new diversion structure in 1942 the acreage has steadily increased. The irrigated area in 1966 reported by the Bureau of Indian Affairs was 36,919 acres.

B. Depletions

During the period of record examined in detail in this report (1941-66), the average yearly consumptive use of water within the Upper Basin is estimated to be about 1,670,000 acre-feet. This is low compared with the irrigated acreage, but some lands do not receive a full supply. The consumptive use is estimated by the application of appropriate consumptive use rates to the irrigated acreage.

As water exported from the Upper Basin during the same period averaged about 345,000 acre-feet, the estimated average Upper Basin consumptive use was about 2 million acre-feet per year. Since completion of the Colorado-Big Thompson Project with initial diversions made in year 1947, the Duchesne Tunnel completed in 1953, and the Roberts Tunnel completed in 1963, the transmountain diversions have increased to around 500,000 acre-feet. Yearly increases or decreases in reservoir content affect annual depletions from the Colorado River, but these changes have little effect on average depletions.

C. Water Compact and Treaties

1. Colorado River Compact

Water of the Colorado River was divided between the Upper and Lower Colorado River Basins by the Colorado River Compact which was signed in 1922 by a commissioner of each of the seven States of the river basin and by a representative of the United States. All States but Arizona ratified the compact prior to its effective date in 1929. The dividing point on the river between the Upper and Lower Basins is at Lee Ferry which is defined as a point one mile below the mouth of the Paria River. The compact apportions to each of the Upper and Lower Basins in perpetuity for exclusive beneficial use a total of 7,500,000 acre-feet annually. In addition to the apportionment of 7,500,000 acre-feet, the Lower Basin is given the right to increase its beneficial consumptive use of water from the Colorado River system by 1,000,000 acre-feet annually. The compact further provides that the States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of 10 consecutive years.

One provision in the compact permits exportation of the water out of the basin as long as it is used beneficially in the seven Basin States and another provision recognizes the obligations of the United States to the Indian tribes. The compact prescribes the manner in which the waters of the Colorado River system may be made available to Mexico under any water rights recognized by the United States.

The compact, in effect, cleared the way for legislation authorizing the construction of major projects such as Boulder Canyon Project, and it also cleared the way for compacts or agreements within the Upper and Lower Basins to further divide the water among the States.

2. Mexican Treaty

The treaty with Mexico, signed in 1944, provides basically for a guaranteed annual delivery by the United States to Mexico of 1,500,000 acre-feet of Colorado River water.

3. Upper Colorado River Basin Compact

With the water allocated to the Upper Basin by the Colorado River Compact and with the Mexican Treaty signed, the Upper Basin States began negotiations which resulted in the signing of the Upper Colorado River Basin Compact in 1948. Under the terms of the compact, Arizona is permitted to use 50,000 acre-feet of water annually from the upper Colorado River system, and the remaining water is apportioned to the other Upper Basin States in the following percentages.

State of Colorado	51.75 percent
State of New Mexico	11.25 percent
State of Utah	23.00 percent
State of Wyoming	14.00 percent

Congress had previously been unwilling to approve projects without assurance that a water supply would be available, so this division of water among the States permitted development in the Upper Basin to proceed and resulted primarily in the authorization of most of the Federal projects above Lee Ferry that are mentioned in this report.

Neither of the compacts specifically mention water quality, but it has been recognized as a factor to be considered in developing projects, and water quality studies have been required by recent legislation authorizing the construction of projects in the Upper Basin.

4. Arizona v. California Suit in the Supreme Court

The States of the Lower Basin have never agreed to a compact for the division of use of the waters of the Lower Colorado River Basin. The State of Arizona filed suit in the Supreme Court of the United States in October 1952 against the State of California and others for the determination of the rights to use the waters of the lower Colorado River system. The Supreme Court gave its decision on June 3, 1963, and issued a decree on March 9, 1964, providing for the apportionment of the use of the waters of the main stream of the Colorado River below Lee Ferry among the States of Arizona, California, and Nevada. The States of Arizona and New Mexico were granted the exclusive use of the waters of the Gila River system in the United States. The decree did not affect the rights or priorities to the use of water in any of the other Lower Basin tributaries of the Colorado River.

The decree permits the States of the Lower Basin to proceed with developments to use their apportionments of Colorado River water. Major new developments would be the Southern Nevada Water Project in Nevada, the Dixie Project in Utah, and the Central Arizona Project in Arizona. Development of the Indian lands is expected to use all of the water allocated to them by the decree. These lands include the Colorado River Indian Reservation, Arizona-California; the Fort Mohave Indian Reservation, Arizona-California-Nevada; and the Chemehuevi Indian Reservation, California.

D. Economic Conditions

The prosperity of agriculture in the upper Colorado River drainage basin generally parallels the prosperity of the livestock industry. With vast areas of fine rangeland available for summer grazing, livestock production is limited by the production of hay for winter feed.

Intensified development of mineral resources in recent years has created new employment opportunities, including off-the-farm work for many farmers. The most extensive and commercially important mineral resources of the basin are coal, oil, and natural gas. The Upper Basin is also the leading domestic source of vanadium, uranium, radium ore, and molybdenum. Copper, zinc, lead, silver, and gold are also commercially important. The increase in population resulting from new job opportunities has created new markets for locally produced and imported products, has taxed municipal facilities and water supplies in several areas, and has increased demands for electricity. Raw materials are stimulating industrial activities in areas adjoining the upper drainage basin, particularly areas near Denver, Pueblo, Provo, and Salt Lake City. These adjoining areas all import water from the Colorado River Basin and without the imported water their economic growth would be limited.

Tourism as an industry has increased significantly in recent years because of the many natural attractions. Manufacturing as a basic industry is of relatively minor importance in the Upper Basin.

Irrigated areas in the Lower Colorado River Basin using Colorado River main stream water are highly productive and the agricultural operations very intensified. Gross crop values per acre probably are greater than any other area of comparable size in the world. For the 1966 crop year, approximately 770,200 acres of irrigated land in the Lower Colorado River Basin were provided a full water supply from the Colorado River and produced a total gross crop income of about $308,443,000. This gives an average gross crop income of $400 per acre.

The Pacific Southwest is one of the most rapidly developing areas in the Nation, both industrially and populationwise. Colorado River water for municipal and industrial purposes is supplied to approximately 130 incorporated towns and other communities in this area. This water supply ranges from a minor supplemental supply for some entities to a complete supply for others.

During 1966 approximately 1,200,000 acre-feet of Colorado River water was supplied to incorporated areas and other communities primarily for municipal and industrial purposes. This water supply served a population of about 10,000,000 people.

PART IV. FUTURE DEVELOPMENT

A. Irrigation

About 358,000 acres of new land to be irrigated within the Upper Colorado River Basin under the recently authorized and proposed projects considered in this report represent an increase of about 25 percent over the previously irrigated area. Approximately 47 percent of this increase is included in two projects--the Seedskadee Project in Wyoming and the Navajo Indian Irrigation Project in New Mexico. The remainder consists primarily of lands on new projects in Colorado and Utah.

Passage of the Colorado River Basin Project Act authorizes a number of projects in the Upper Colorado River Basin and the Central Arizona Project and reauthorizes the Dixie Project in the Lower Colorado River Basin. Water from the Colorado River for the Central Arizona Project would be delivered through the Granite Reef Aqueduct and Pumping Plants. The Dixie Project, Utah, in the Virgin River Basin would provide a full water supply to 6,900 acres of new land and a supplemental water supply to about 10,000 acres of existing irrigated lands.

The Bureau of Indian Affairs reports that 107,599 acres of land on the Colorado River Indian Reservation are planned for irrigation. This includes the present (1966) development of about 36,900 acres. A major portion of the 18,974 acres of land on the Ft. Mohave Indian Reservation is under development contract. Nineteen hundred acres of land on the Chemehuevi Indian Reservation are planned to be fully developed by 1990.

B. Depletions on New Projects

The anticipated new depletions of water from Federal projects recently authorized and other miscellaneous projects are indicated in Table No. 20. The 632,000-acre-foot depletion resulting from reservoir losses will occur gradually as the reservoirs fill, with the full depletion dependent primarily upon the time required for filling Lake Powell. As of 1966 the annual evaporation losses are estimated to be 314,000 acre-feet. The remaining 1,930,000 acre-feet of depletions tabulated for the Upper Basin will be due to uses other than reservoir evaporation. The new depletions include about 700,000 acre-feet of transmountain diversions.

The Dixie Project will deplete the Virgin River Basin by 48,000 acre-feet. This depletion includes the future annual stream depletions of 5,800 acre-feet resulting from transbasin exports to Cedar City, evaporation from Kolob Reservoir, and depletions to the Santa Clara River due to well development on the Santa Clara River.

Diversions from Lake Mead for the recently authorized Southern Nevada Water Project will deplete the Colorado River Basin by an estimated additional 253,000 acre-feet annually.

FUTURE DEVELOPMENT

Diversions from Lake Havasu above Parker Dam for the Bureau of Indian Affairs on the Fort Mohave and Chemehuevi Indian Reservations would deplete the Colorado River by 83,000 acre-feet.

The Central Arizona Project would deplete the Colorado River by an additional 725,000 acre-feet under temporary use conditions. Following development of increment No. 5 described herein, new depletions by the Central Arizona Project would be about 49,000 acre-feet.

Diversions from below Parker Dam by the Colorado River Indian Reservation would deplete the Colorado River by an additional 229,000 acre-feet.

Additional salvage of water by the authorized channelization of the Lower Colorado River upstream from Imperial Dam and a proposed phreatophyte eradication and control program would increase the water supply of the Colorado River Basin by an estimated additional 201,000 acre-feet annually.

C. Economic Impact

The benefits created by the Colorado River Storage Project are becoming a reality as the constructed facilities of the units and projects are completed. All four storage units and six participating projects, plus the Vernal Unit of the Central Utah Project, are practically completed and operating.

In 1967 approximately 81,000 acres of land were irrigated wholly or in part with water provided by six participating projects and the Vernal Unit. Crops produced on these projects were valued at an estimated $4.6 million. Most important, farming operations were carried on without significant water shortages.

Electric power is now being delivered under firm power contracts from Flaming Gorge, Glen Canyon, and Curecanti Units. The contracts (generally for a 20-year duration) are with about 80 customers and presently provide for service in an ultimate amount to about 989 megawatts. Power under contract for the summer of 1968 totals 695 megawatts. The total power-producing capability of the CRSP less reserves is estimated at about 820 megawatts at the present time and 1,345 in 1977 upon completion of all presently scheduled units. Total revenues from power operations were about $0.5 million in fiscal year 1964, $6.8 million in fiscal year 1965, $12.4 million in fiscal year 1966, and $15.9 million in fiscal year 1967.

Stable water supplies created by the reservoirs of the CRSP have contributed to the establishment of new industries and the planning of industrial capacities to meet future needs.

The Bureau of Reclamation is presently negotiating contracts to supply private industries with water essential for nearly 10 million kilowatts of installed thermal generating capacity planned for construction near Lake Powell and the Navajo Reservoir. Among the direct benefits from a development of this magnitude would be about $1 billion in at-site plant investment, around $20 million annual payroll, and substantial payments for coal. Contracts to supply approximately 25,000 acre-feet of CRSP water for other industrial uses are also under negotiation. Approximately 1,600 acre-feet of municipal water is being supplied to the city of Vernal, Utah, from the Vernal Unit of the Central Utah Project.

In 1967 there were about 588,000 man-days of visits made to Lake Powell, 1,553,000 to Flaming Gorge Reservoir, 419,000 to Navajo Reservoir, and 183,000 to Blue Mesa Reservoir. The Flaming Gorge Reservoir and Lake Powell have already attained national reputation as recreation meccas. No dollar values can be assigned to the value of recreation, but several million dollars annually are being added to the gross national product by recreation attractions afforded by the new reservoirs of the CRSP units and projects.

Water from the Dixie Project will improve and stabilize economic conditions in southwestern Utah.

Water diverted from Lake Mead for the Southern Nevada Water Project will improve and stabilize economic conditions in southern Nevada by providing supplemental municipal and industrial water to the rapidly expanding urban area in Clark County in southern Nevada. In addition, water will be provided for the potential development of Eldorado Valley southwest of Boulder City, Nevada.

Water diverted from the Colorado River below Davis Dam for the Fort Mohave, Chemehuevi, and Colorado River Indian Reservations will improve and stabilize the economy of the Indian Reservations.

Water salvaged along the lower Colorado River by the channelization program and the eradication of phreatophytes along the lower Colorado River would improve and assist in stabilizing economic conditions in the Lower Colorado River Basin by providing additional water supply for use throughout the area.

Water diverted from Lake Havasu for the Central Arizona Project will stabilize the water supply for the Phoenix and Tucson areas and reduce the ground water mining to these areas.

D. Current Proposals

The current proposals include an additional 676,000 acre-feet of depletions of which 240,000 acre-feet would be for municipal and industrial uses and the balance for irrigation projects. The irrigation projects located mostly in Colorado would add another 146,000 acres of new land to the presently irrigated acreage and, although the overall economic impact has not been assessed, the effect would be similar to the results obtained from other projects in the Upper Colorado River Basin.

The municipal and industrial uses include 102,000 acre-feet to supply a coal-burning electric plant on the shores of Lake Powell, some transbasin diversions, and some inbasin uses.

PART V. BASIC STUDIES

A. Objectives

Studies of past and future effects of storage and irrigation projects on the quality of water downstream depend primarily on records of streamflow and quality of water collected before the project was constructed as well as afterward. Many projects were built before the need for antecedent data was recognized, and as a result data adequately defining the effects of existing projects are rare.

The primary requisites for a comprehensive quality of water study of an irrigated area are inflow and outflow measurements of both quantity and quality of water. Each gaging station and quality sampling site is expensive to install and maintain, so with limited funds available care must be exercised in the selection of special study areas. If gaging stations are already in operation, these are used with the addition of quality sampling. If gaging stations do not exist, funds are advanced to the Geological Survey through a cooperative program to install and maintain stations and to collect and analyze the water samples.

A meaningful study should be based on a period of at least 4 to 10 years on the smaller or well-defined basin areas with the length of period partly dependent on how stable the irrigation practices are. It must be recognized that each area will have a different effect on water quality. To reflect the effect of continuing development in larger basins, studies will need to be continued for a long period.

The studies in the basin thus far have been limited to a comparison of the total dissolved solids in the inflowing water and the return flow water. No attempt has been made to determine losses of water or total dissolved solids by deep percolation, to detect underground aquifers that might be augmented with return flow, or to evaluate changes in chemical characteristics (other than dissolved solids) resulting from development.

Studies prior to irrigation would be helpful, but they have not been made in most areas, so comparisons must be made when new land is added or new storage is made available. A study is now underway for the Seedskadee Project area. This will give a comparison between "before" and "after" irrigation conditions since only the land in an experimental farm is presently irrigated on the Seedskadee Project.

Favorable salt balance conditions exist when the amount of dissolved solids carried off the land by irrigation return flows is equal to or greater than the amount carried to the land by irrigation water. The term "pickup of dissolved solids from irrigated lands" as used in this report applies to dissolved solids picked up in addition to favorable salt balance conditions.

BASIC STUDIES

Studies conducted thus far indicate that there is much variation in the amount of pickup from irrigated land. For comparison the analyses in this report are based on values of zero and 2 tons per acre pickup from new irrigated land. The results of both analyses are shown in Table No. 19. It is assumed that no additional pickup will result from the addition of supplemental water to presently irrigated lands.

B. Key Stations

The study period for the 1963 report was from 1941 through 1958, inclusive; the period for the 1965 report was extended an additional 3 years through 1961, the 1967 report includes data through 1964, and the present report includes an additional 2 years through 1966. Both flow and quality records are available for this extended period.

Quality of water and flow records are generally available for the 18 stations selected for this study of the Colorado River Basin. When records were not available, they were developed by corollary studies from which data for the periods of missing records were estimated.

Figure No. 1 indicates the location, and the following descriptions summarize records for the period of study. Figure No. 12 shows the available flow and quality records of the key stations for the period 1941-66. Basic records used in this report were selected from those obtained by the Geological Survey under a continuing program for collection of water records. Part of the data collection program is supported by funds transferred by the Bureau of Reclamation to the Geological Survey.

To simplify tabulation, monthly values of flow and total dissolved solids as shown in Tables 1 to 18 have been rounded to the nearest 1,000 except for concentration values. This rounding resulted in some differences between the recorded and the computed monthly concentrations when the flows were often below 1,000 acre-feet and the loads below 1,000 tons. For example, in the San Rafael and Duchesne drainages and on the Green River near Greendale during the filling of Flaming Gorge Reservoir, some of the flows are less than 1,000 acre-feet per month; hence, some monthly values of concentration shown in the tables differ from those actually recorded because of the method of rounding. Similarly, minor differences from published data in monthly concentrations occur in isolated instances in the flow and quality tables for the other stations.

A brief resume of the source and method of derivation for each of the records of the stations shown on Figure No. 1 and in Tables 1 to 18, inclusive, follows:

1. Stations with Complete Records

Records of flow and water quality are available for nearly all of the 1941-66 period for the Green River at Green River, Utah (Table No. 5);

Colorado River near Glenwood Springs, Colorado (Table 7); Colorado River near Cameo, Colorado (Table No. 8); Gunnison River near Grand Junction, Colorado (Table No. 9); Colorado River near Cisco, Utah (Table No. 10); and San Juan River near Bluff, Utah (Table No. 12). Minor extensions only were needed to fill in short periods of records for a few of these stations.

2. Green River near Green River, Wyoming

Flow records are available at this station (Table No. 1) from April 1951 and quality records from March 1951. The records have been extended back to 1941 by correlation with nearby stations.

3. Green River near Greendale, Utah, and near Ouray, Utah

Flow measurements or comparable data are available for the Green River near Greendale (Table No. 2), but chemical quality data are available only for the years 1957 through 1966, inclusive. Flow measurements near Ouray, Utah (Table No. 4), are available for the 1948-September 1966 period, but quality records are limited to the years 1951, 1952, and 1957 through September 1966. Extensive correlations with other available records on the Green River system were employed to develop the estimates shown herein for both streamflow and dissolved solids.

4. Duchesne River near Randlett, Utah

Flow records have been obtained continuously since 1943 and quality data are available for 1951 and 1957 through 1966 (Table No. 3). Correlations with other stations in the Duchesne River system were employed to estimate the data for the missing periods.

5. San Juan River near Archuleta, New Mexico

Flow and quality load data presented are a combination of measurements obtained near Archuleta and at Blanco, New Mexico, with some adjustments and correlations for the period 1945-66 (Table No. 11). Correlations were employed to estimate the data for 1941-45.

6. San Rafael River near Green River, Utah

Correlations were used to estimate flow at this gage from 1941 to 1945 after which measurements of flow were taken (Table No. 6). Quality sampling was begun in 1946 and is complete for the remainder of the study period except for 1950. Extensions of available data provided satisfactory estimates of the quality load for the missing years.

7. Colorado River at Lees Ferry, Arizona

This station has complete flow records available for the study period but lacks quality of water measurements for 1941, 1942, 1946, and

1947 (Table No. 13). Load data for these years were estimated by extensive multiple correlations using data for the Colorado River near Cisco, Utah, and near Grand Canyon, Arizona; the Green River at Green River, Utah; and the San Juan River near Bluff, Utah.

8. Colorado River near Grand Canyon, Arizona

Discharge measurements are available for the period of study and chemical quality records are available except for the period December 1942 to August 1943 (Table No. 14). Loads for the period of missing records were estimated from records at upstream stations.

9. Virgin River at Littlefield, Arizona

Discharge measurements were obtained for the study period but quality data are available only from July 1949 to December 1966. Detailed correlations were employed to estimate the data for the missing period (Table No. 15).

10. Colorado River below Hoover Dam, Arizona-Nevada

Discharge and quality records are available for the 1941-66 period (Table No. 16), except for the period November 1944 to September 1950 when these quality data are based on specific conductance analyses only for intermittent intervals.

11. Colorado River below Parker Dam, Arizona-California

Discharge measurements for the study period are included in records of the Geological Survey. Quality data have been obtained since July 1941 by the Metropolitan Water District of Southern California at the Lake Havasu Intake Pumping Plant and are published in its Report No. 815 dated November 1963 for the July 1941 through September 1963 period. The 6 months of missing record were obtained by correlation. Monthly records of the chemical analyses of constituents for July 1941 through December 1966 were obtained from the Metropolitan Water District of Southern California (Table No. 17).

12. Colorado River at Imperial Dam, Arizona-California

Discharge figures are available for the study period. Those from October 1942 through September 1960 are based on the combined records of discharge obtained at gaging stations on Colorado River at Yuma, All-American Canal near Imperial Dam, Gila Gravity Main Canal at Imperial Dam, Yuma Main Canal at Laguna Dam, and North Gila Valley Canal at Laguna Dam less that of Gila River near Dome, Arizona. Records after September 1960 are based on the combined daily discharge of Colorado River passing Imperial Dam and at gaging stations on All-American Canal near Imperial Dam and Gila Gravity Main Canal at Imperial Dam.

Quality data for the period January 1941 to 1943 were obtained from the U.S. Department of Agriculture salinity laboratory at Riverside, California, and the remainder, 1943 to 1966, were obtained from U.S. Geological Survey Water Supply Papers and provisional records and are based on data for the Yuma Main Canal below the Colorado River siphon (Table No. 18).

C. Analyses

Published quality of water records consist of a combination of stream discharges with chemical analyses of stream water samples collected at more or less regular intervals. The reliability of the records depends on the accuracy of the streamflow records, the frequency of collection and representativeness of the samples, the stability of the samples during the storage periods prior to the making of the analyses, the completeness and accuracy of the individual analyses, and the manner in which the individual samples are combined before analysis to represent increments of stream discharge.

Most of the water analyses forming the basic data for the chemical records in this report were made in the laboratories of the Geological Survey at Washington, D.C., Albuquerque, New Mexico, and Salt Lake City, Utah, using standard procedures, by chemists specifically trained in water analysis. During the 26-year period considered there were numerous changes in laboratory techniques and procedures, mostly due to introduction of new instrumental methods. New procedures were adopted only after careful investigation to insure results consistent with those obtained previously. Some of the quality of water records are based on analysis of samples by Bureau of Reclamation laboratories. Bureau of Reclamation results and methods have been checked by the Geological Survey to insure comparable records. Analyses by the Metropolitan Water District have been made by standardized procedures and appear to be comparable with analyses by the Geological Survey. It is probable that errors in the load computations due to errors in the analyses are less than those due to changes in the samples upon storage, inaccuracies in sampling, or inaccuracies in the determination of stream discharges.

D. Studies of Certain Areas

Special quality of water studies have been made in a number of irrigated areas to determine storage and irrigation effects on water quality. Sufficient quality data have been collected by the Bureau of Reclamation in two of these areas to indicate trends.

1. Eden Project

Quality of water data were collected in the Eden Project area before the Colorado River Storage Project Act was passed in 1956. Data are

Eden Project, Wyoming

Year	Ac.-ft. flow or tons T.D.S.	Inflow	Outflow	Difference	Irrigated acres	Tons/ acre
1955	A.F.	51,200	17,500	33,700		
	Tons	8,200	53,900	45,600	8,700	5.2
1956	A.F.	50,300	3,600	46,700		
	Tons	7,000	49,500	42,500	8,600	5.0
1957	A.F.	46,100	13,400	32,700		
	Tons	6,400	75,500	69,100	10,500	6.6
1958	A.F.	65,000	23,500	41,500		
	Tons	9,500	81,300	71,800	12,900	5.6
1959	A.F.	40,600	11,700	28,900		
	Tons	6,700	57,300	50,600	13,000	3.9
1960	A.F.	28,600	4,900	23,700		
	Tons	5,200	35,900	30,700	12,700	2.4
1961	A.F.	29,100	3,300	25,800		
	Tons	4,600	28,400	23,800	12,000	2.0
1962	A.F.	59,900	5,300	54,600		
	Tons	9,300	37,300	28,000	14,100	2.0
1963	A.F.	53,400	12,200	41,200		
	Tons	7,600	51,300	43,700	13,500	3.2
1964	A.F.	57,800	15,800	42,000		
	Tons	8,200	60,800	52,600	13,800	3.8
1965	A.F.	59,900	19,700	36,200		
	Tons	7,000	70,400	63,400	14,700	4.3
1966	A.F.	60,500	24,600	35,900		
	Tons	9,400	80,200	70,800	14,400	4.9

available for the 12 years 1955-66 covering the development period. The amount of dissolved solids (as measured in Big Sandy Creek) picked up from project lands has varied considerably over the years, being high the first 4 years, low the next 4 years, slightly higher the next 2 years, and higher the last 2 years. There has also been a variation in the number of acres irrigated, in the available water supply, and in the dissolved-solids increases as new land is brought under irrigation. Leaching of the more soluble salts from newly irrigated land takes place rapidly. As time passes the amount of material leached decreases until a balance is achieved between salt buildup and leaching rates. For example, during the 4 years 1958 through 1961, irrigated acreage was relatively constant. If, during the first 2 years, it is assumed that initial leaching was taking place, then the last 2 years may represent the normal dissolved-solids pickup of about 2.2 tons per acre for these irrigated lands. This pickup may be low, however, because during both 1960 and 1961 only a little runoff was available to flush accumulated salts into Big Sandy Creek. The increase in the years 1964-66 is believed principally due to leaching of salts accumulated during the drouth years, addition of some new lands, and increase of return flows due to higher moisture content of the soil.

The results of this study, shown in the accompanying table, involve some complications. Drainage from some of the irrigated land does not reach Big Sandy Creek but is consumed by nonbeneficial vegetation. Some losses in return flow occur between the irrigated area and the measuring point on Big Sandy Creek. On the other hand, salt pickup from nonirrigated lands between the irrigated area and the measuring point on Big Sandy Creek are reflected in the records. The measured pickup of salts from the irrigated land would undoubtedly be greater if the total amount of return flow were included, but this is offset somewhat by the pickup from the above mentioned nonirrigated areas.

The Eden Project has had poor drainage which has resulted in salt accumulation. The construction of drains relieved this situation and caused the accumulated soluble salts to leach into the streams. The values by years for the 12-year period are tabulated in the accompanying table.

Collection of data should be continued for a few years during which acreages irrigated are relatively constant to further determine the trend in salt pickup and whether possible errors in quality or flow measurements have unduly influenced the conclusions.

2. Florida Project

Construction of the Florida Project was completed in 1965. The Lemon Reservoir on Florida River regulates the flow of the river for irrigation of 19,450 acres of land including 5,730 acres not previously irrigated and 13,720 acres in need of supplemental water.

BASIC STUDIES

In order to obtain quality information under preproject conditions, flow and quality data were collected at several points in the Florida Project area beginning in 1958. A study has been made of these data for the period 1958-63 to show the effect irrigation of these lands has on the quality of return flows leaving the project under the condition of no storage.

An attempt was made in this study to measure the effect of irrigation in the Florida area on the quality of water in the Animas River below its confluence with the Florida River. It was found that the difference in concentration, however, is scarcely discernible and is within the limits of error of measurement of both flow and quality.

Florida Project, Colorado

Year	Ac.-ft. or tons	Inflow	Outflow	Difference	Pickup (tons/ acre)	Loss (tons/ acre)
1958	A.F.	99,800	90,360	9,440		
	Tons	14,315	15,470	+1,155	0.08	
1959	A.F.	28,260	14,300	13,960		
	Tons	4,900	4,365	525		0.04
1960	A.F.	73,130	60,600	12,530		
	Tons	10,600	11,730	+1,130	0.08	
1961	A.F.	58,490	41,430	17,060		
	Tons	9,100	8,970	130		0.01
1962	A.F.	67,070	48,470	18,600		
	Tons	10,220	10,220	0	0	
1963	A.F.	45,800	33,750	12,050		
	Tons	7,889	7,100	789		0.06

From the above tabulation it is apparent that there has been a very small amount of pickup measured in the river downstream from the project. The concentration of total dissolved solids in the inflowing water ranges from 0.14 to 0.17 ton per acre-foot, and that of the outflowing water ranges from 0.17 to 0.30. About 13,720 acres were irrigated prior to construction of the project facilities.

The full irrigable acreage (13,720) was used in computing the pickup in tons per acre, even though some land was irrigated only once a year; therefore, the apparent losses of salt and the extremely low pickup may be due to lack of sufficient water to insure leaching.

Irrigation has been practiced for many years in the Florida area without adverse effects because of the extremely good water and the good drainage conditions.

The Florida Project soils and the adjoining Pine River Project soils are naturally low in salinity and alkalinity, and the amount of dissolved solids removed from these projects is about equal to the amount deposited.

Very little increase in dissolved-solids pickup is expected when the expanded project goes into full operation.

The studies described above afford some support for the assumptions set forth earlier in the report that a pickup range of from zero to 2 tons per acre is indicated for irrigated acreages after the initial leaching. The pickup on the Florida Project is negligible and that on the Eden Project will probably stabilize a little above 2 tons per acre.

Considerable variation in the effects of irrigation return flow on water quality is to be expected. Differences arise due to the size of the irrigated areas, the number of times the return flow is reused, properties of the soils and drainage area, number of years land has been irrigated, nature of aquifers, rainfall, dilution, temperature, irrigation methods, storage reservoirs, vegetation, and type of return flow channels.

Consumptive use and return flow studies are now being undertaken by the Bureau of Reclamation on existing projects in small, closely controlled areas. With a small additional expense, it has been possible to obtain quality data and thereby determine the effect of irrigation on water quality. The study areas are purposely being held small to achieve better control, but they will be as representative as possible of existing projects. The results pertaining to the quantity of return flow will be very helpful in estimating effects on water quality of return flows from larger areas where measurement of inflow and outflow is not always possible or practical.

Special studies in other areas in the basin will be undertaken from time to time to determine water quality conditions, and studies of projects such as Florida and Eden will be repeated or continued in order to evaluate changes with time. The more complex areas will be considered for investigation at a later date when sufficient funds are available to carry out meaningful studies. Projects in this category include the Grand Valley and Uncompahgre Projects in Colorado and possibly some direct diversion projects along the Colorado River below Hoover Dam, such as Palo Verde Valley and the Colorado River Indian Reservation. An important consideration in quality studies is measurement of return flow. If the return flow can be measured and its quality determined, the water and salt budgets can be computed because the inflow is nearly always gaged and its quality easily determined.

Two areas now being monitored for irrigation effects are the Seedskadee Development Farm and a block of about 700 acres of land within the Grand Valley Project. The Grand Valley area is partially isolated by natural washes and drained sufficiently to permit sampling and measuring of return flows. Sampling began during the 1966 irrigation season, but the results are not significant enough to indicate a trend.

3. Chemical Quality of the Colorado River below Lees Ferry

The discharge-weighted average concentration of dissolved solids in the water from the Colorado River at Lees Ferry for the 1941-62 period is a function of the river discharge. This relation is shown on Figure 2. However, since 1962 this relation has been affected by storage of water in Lake Powell. The concentrations of dissolved solids at Lees Ferry were higher than would have been expected without storage during the first 3 years of regulation and were lower then expected during the ensuing 2 years (1966-67).

By adjusting the discharge at Lees Ferry for storage in Lake Powell beginning with the 1963 water year, the dissolved-solids concentration that would have been expected without storage was obtained from the established dissolved-solids discharge relation. The following tabulation shows the measured and adjusted discharges and measured and expected weighted average dissolved-solids concentrations for the Colorado River at Lees Ferry for the period 1963-67. (The data for 1967 is preliminary.)

Colorado River at Lees Ferry

Calendar year	Dissolved solids: Expected, P.p.m.	Dissolved solids: Expected, Tons per acre-foot	Dissolved solids: Actual, P.p.m.	Dissolved solids: Actual, Tons per acre-foot	Discharge (million acre-feet): Adjusted	Discharge (million acre-feet): Actual
1963	825	1.12	935	1.27	4.94	1.38
1964	675	.92	810	1.10	7.68	3.24
1965	485	.66	575	.78	15.15	11.59
1966	675	.92	515	.70	7.60	7.74
1967	650	.88	620	.84	8.45	7.56

P.p.m. = parts per million (equivalent to milligrams per liter at these concentrations).

The data from the above tabulation plotted on Figure 2 show that during the filling of the reservoir (1963-65) the measured concentrations of dissolved solids in the water released from the reservoir were greater than would have existed without the storage. However, during 2 years of withdrawing water from storage, 1966-67, the measured concentrations were less than the expected.

The concentration in all years subsequent to the start of regulation is influenced by the concentration of the water already in storage and the degree of stratification in the reservoir, as well as runoff conditions in the given year. Thus the concentrations at Lees Ferry in 1963, 1964, and 1965 were somewhat higher than would have been expected without storage because of initial storage of water of higher than average concentrations in 1963, relatively low runoff in 1963 and 1964, and release of water of higher than average concentration as a result of stratification.

RELATION BETWEEN ANNUAL AVERAGE STREAMFLOW
AND DISSOLVED SOLIDS CONCENTRATIONS 1941-67
COLORADO RIVER AT LEES FERRY, ARIZONA

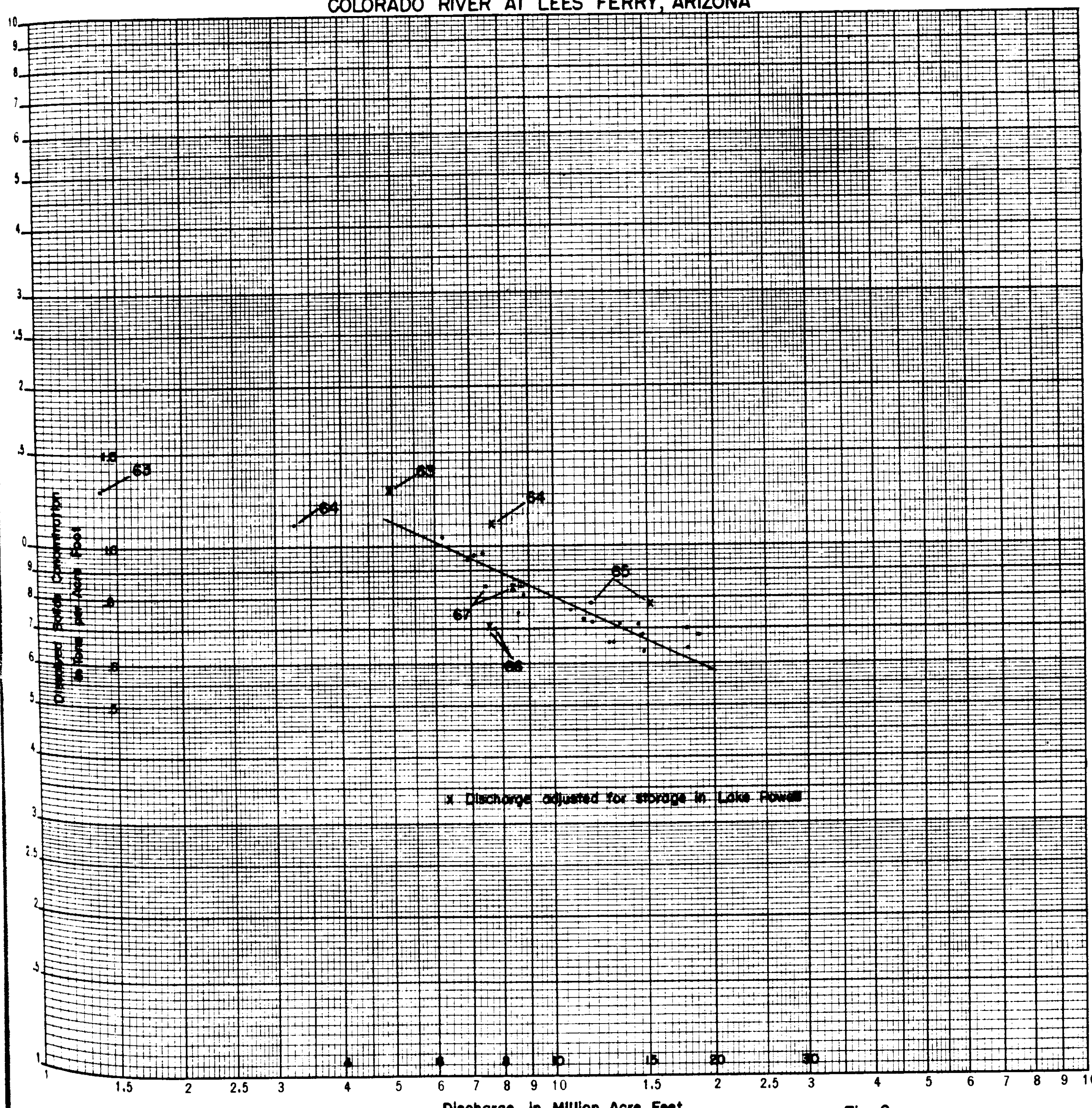


Fig. 2

The rather large reduction in outflow concentration occurring in 1966 resulted from the diluting effect of the unusually high inflow of dilute water during the spring runoff period of 1965.

The increase in concentration of outflow water in 1967 resulted because total inflow and the ratio of spring inflow to total flow in both 1966 and 1967 was lower than in 1965.

The effects of evaporation and chemical precipitation due to Lake Powell cannot yet be clearly evaluated.

Experience is too short at this time to define a concentration-discharge relation at Lees Ferry subsequent to the closing of Glen Canyon Dam. In fact, one should not expect a close correlation between concentration and discharge at Lees Ferry. There will always be a lag in the response of concentration of outflow water at Glen Canyon Dam to inflow conditions due to storage and stratification in the reservoir. This is borne out by experience below Hoover Dam.

The salinity of the Colorado River at several points below Lees Ferry varies from year to year (Figure 3). The salinity of the river at Grand Canyon for 1963-64 increased considerably owing to the effect of the extremely low flows at Lees Ferry; the highly concentrated water from Blue Springs on the Little Colorado River contributed a larger proportion of the total flow during this low flow period. The salinity data for the period of record, 1941-66, show increased concentrations downstream to Imperial Dam. These increases are caused in part by salt inflow from irrigation returns, springs and seeps, solution of salts, and effects of concentration by evaporation of water in the reservoirs.

E. Effects of Impoundments

1. Flaming Gorge Reservoir

Quality of water in the reservoir.--In October 1966 water quality samples were collected at the surface, bottom, and seven intermediate points from each of six sites in the reservoir (Figure 4). Some additional data are available from two sites in the reservoir for March 1967 and from three sites for September 1967. The approximate dissolved-solids distribution in the reservoir during these sampling times is shown in Figures 5 and 6. There are not enough data available to define the annual limnological cycle of the reservoir. However, these data do give some indication of the movement of water through the reservoir during different times of the year.

The measured load of dissolved solids in the reservoir on October 1, 1966, was about 1,850,000 tons. This figure was computed, using the data from the six sampling verticals and area capacity curves. In order to

WEIGHTED AVERAGE DISSOLVED SOLIDS CONCENTRATIONS, COLORADO RIVER BELOW LEES FERRY, ARIZONA

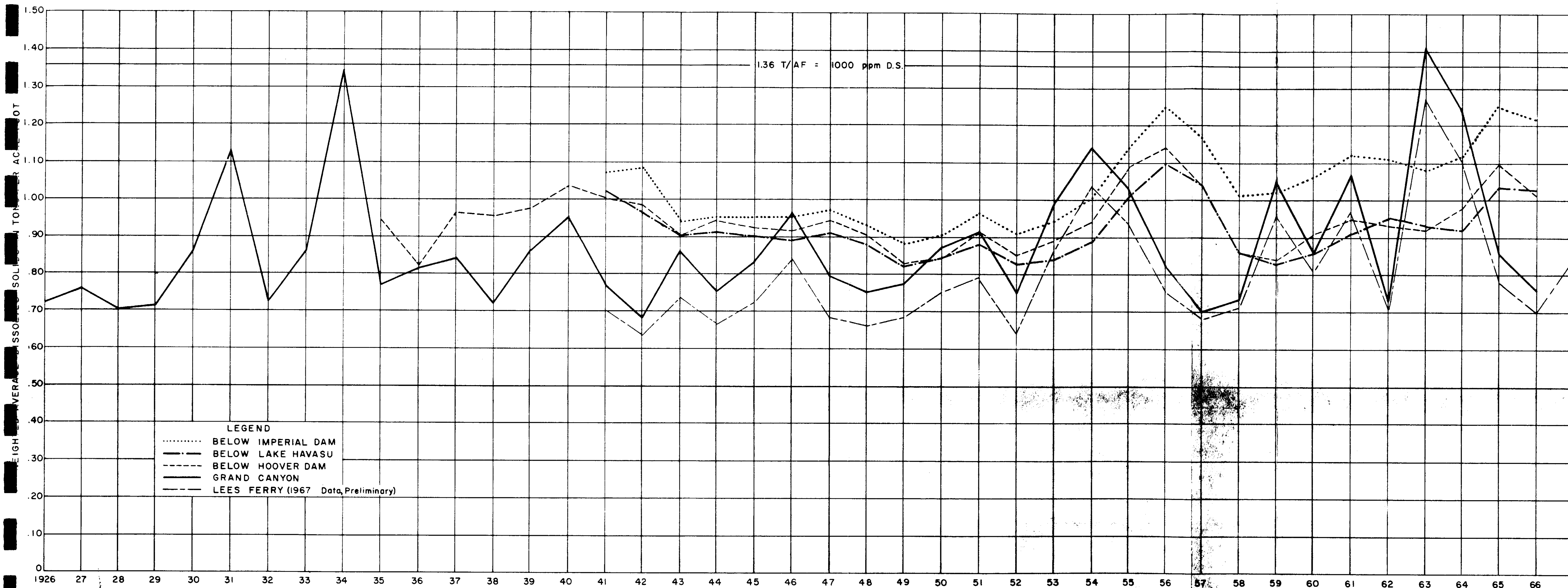


Figure 3

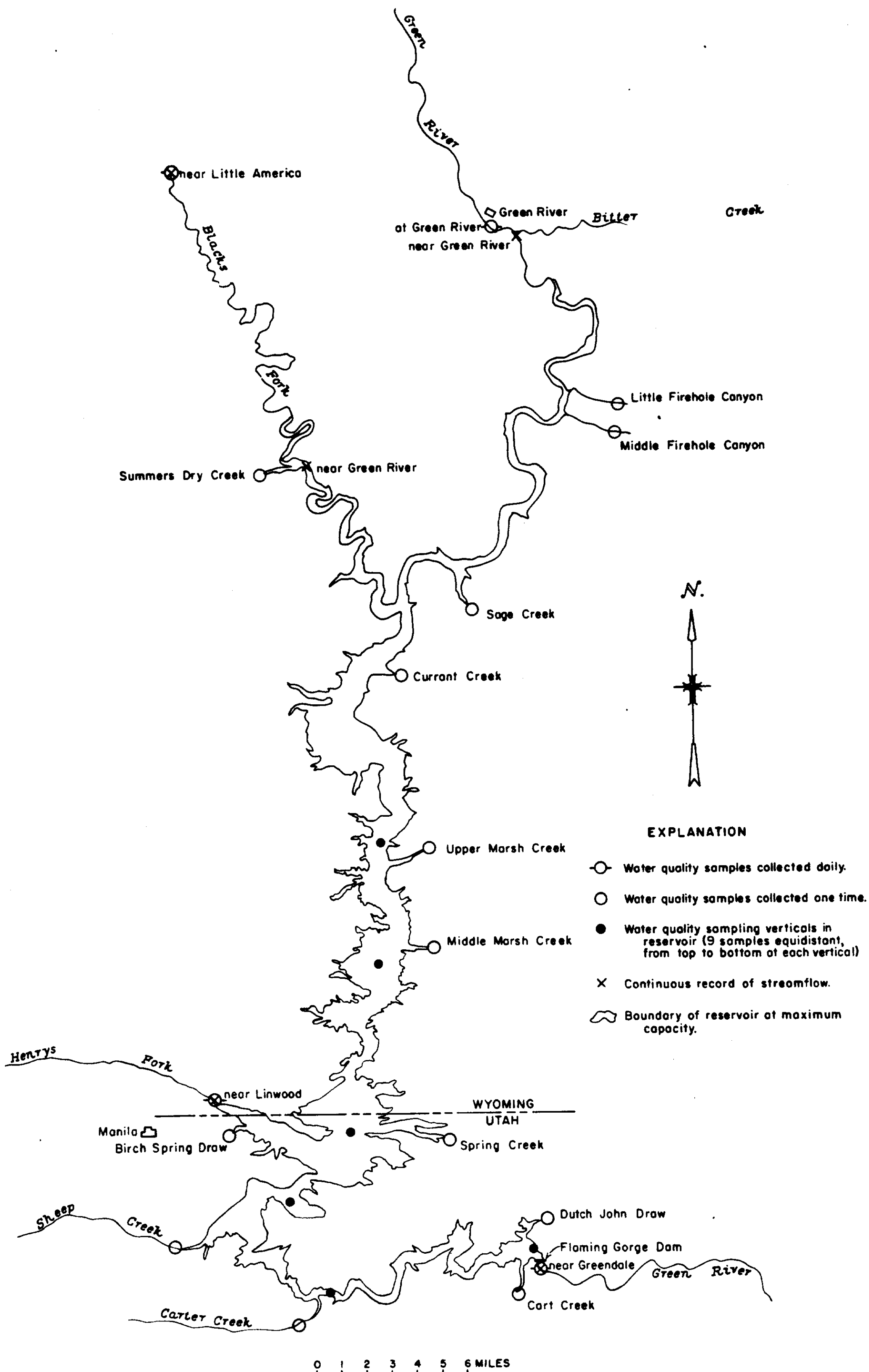
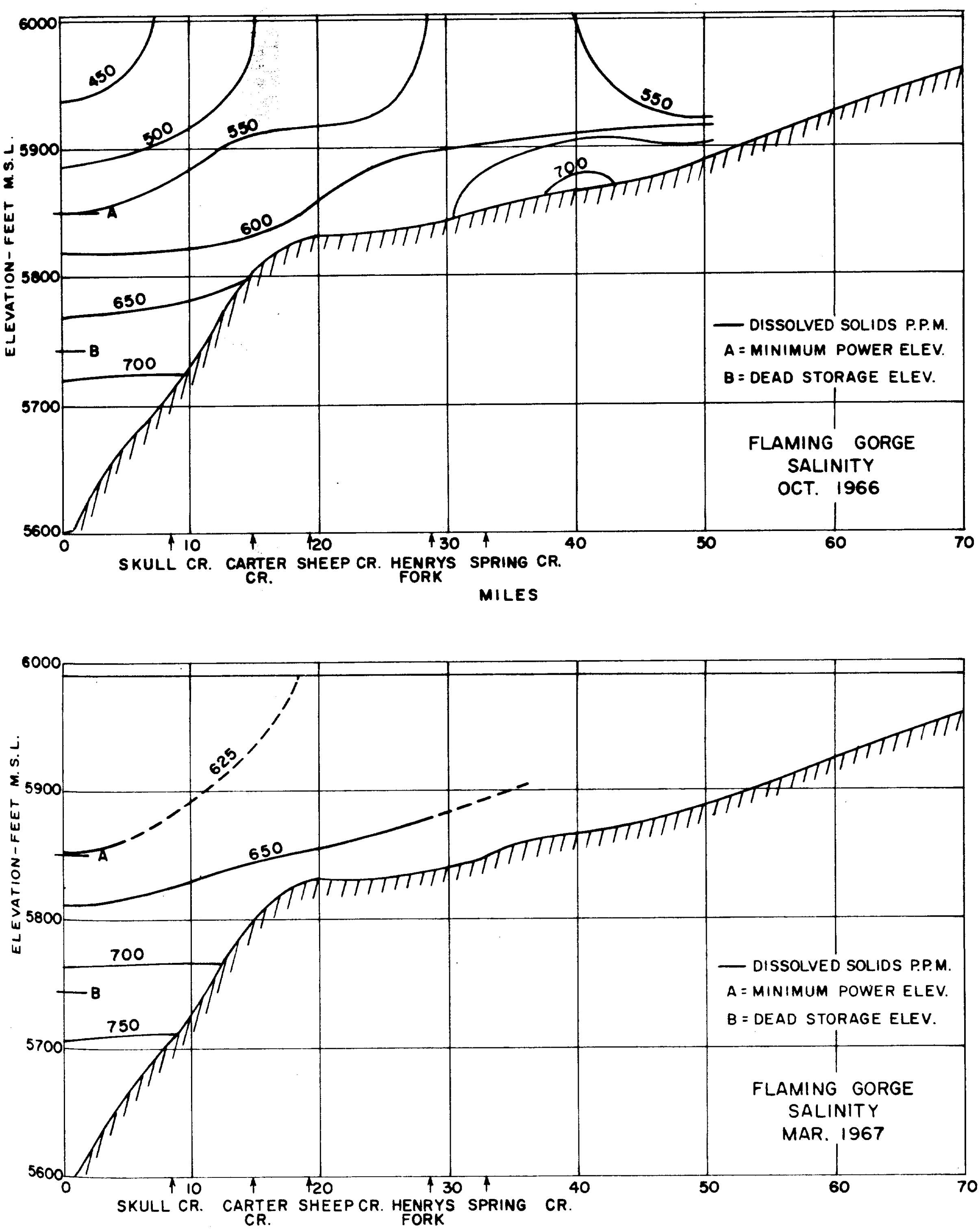


Fig. 4 Flaming Gorge Reservoir Area



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SKULL CR.
CARTER CR.
SHEEP CR.
HENRYS FORK
SPRING CR.
MILES
— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
FLAMING GORGE
SALINITY
OCT. 1966
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ELEVATION-FEET M.S.L.
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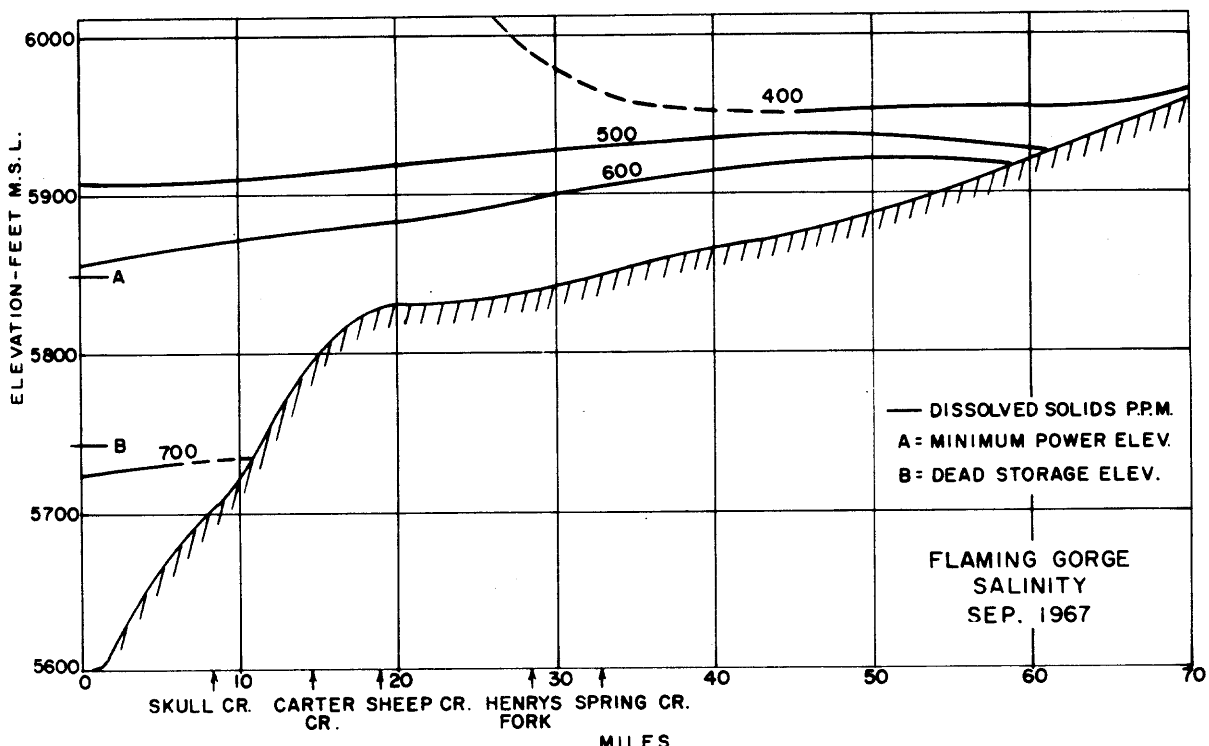
SKULL CR.
CARTER CR.
SHEEP CR.
HENRYS FORK
SPRING CR.
MILES
— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
FLAMING GORGE
SALINITY
MAR. 1967

Fig. 5



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— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
FLAMING GORGE
SALINITY
SEP. 1967
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SKULL CR.
CARTER CR.
SHEEP CR.
HENRYS FORK
SPRING CR.
MILES

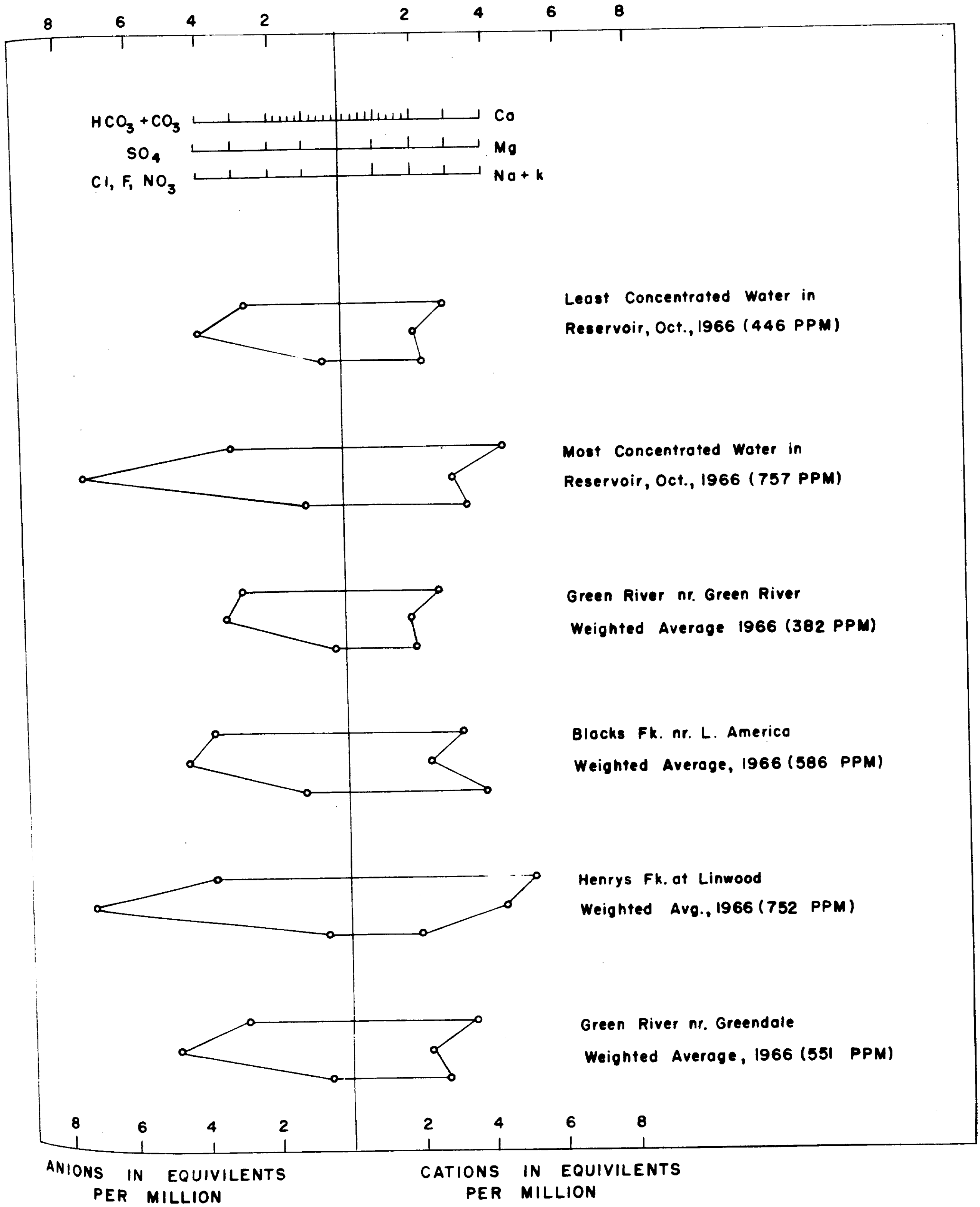
Fig. 6

get an idea of initial leaching and storage, a theoretical load as of October 1, 1966, was also computed, using available inflow and outflow data. This theoretical load which represents the amount of dissolved solids contributed to the reservoir from runoff only was about 1,050,000 tons. The data used to arrive at the above figures are not seasonally continuous and they cover only a short period of time (1957-66). The chemical quality of the major inflowing tributaries (Green River at Green River, Wyoming, Blacks Fork at Little America, Wyoming, and Henrys Fork at Linwood, Utah) has been measured since 1952, but the outflow at Greendale has been observed only since 1957 after construction began. The relationship used to estimate unmeasured inflow is not precise. For these reasons the figures should be considered as estimates only. The difference of 800,000 tons between the measured load and theoretical load represents the estimated amount of dissolved solids added by leaching since closure of the reservoir.

The chemical composition of the water in the reservoir on October 1, 1966, was found to be very uniform. The dissolved ions showed an increase in concentration with depth, but the ionic ratios were relatively constant regardless of depth or concentration. The major ions in solution are calcium and sulfate. Calcium and magnesium ranged from 64 to 72 percent of the dissolved cations and sulfate comprised 53-65 percent of the dissolved anions.

Quality of inflow waters.--The major inflow to the reservoir is from Green River which contributes 70-95 percent of the water, but only 55-65 percent of the inflow load of dissolved solids. Because of their higher concentration of dissolved solids, Blacks Fork and Henrys Fork contribute a higher percentage of the dissolved-solids load than they do of water. Figure 7 shows the range in chemical character of the water in the reservoir on October 1, 1966, and the average chemical composition of the outflow and the major tributaries during 1966.

The minor tributaries contribute less than 10 percent of the total inflow to the reservoir and account for less than 15 percent of the total incoming load. The streams draining into the upper part of the reservoir above Henrys Fork are mostly intermittent. The total amount of water they contribute is small, but they are high in dissolved-solids content. Carter Creek, Cart Creek, and Sheep Creek, which drain into the lower section of the reservoir from mountainous areas, contribute larger amounts of water but are more dilute. During a high flow period in June 1967, the discharge of the minor tributaries was measured and water quality samples collected. Data from these samples are shown on Table A.



CHEMICAL COMPOSITION OF WATER IN FLAMING GORGE RESERVOIR, ITS MAJOR TRIBUTARIES AND GREEN RIVER BELOW THE RESERVOIR

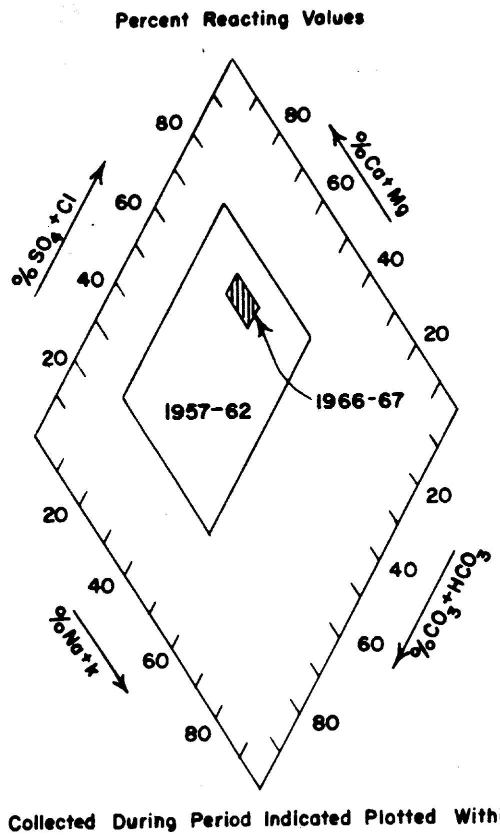
Fig. 7

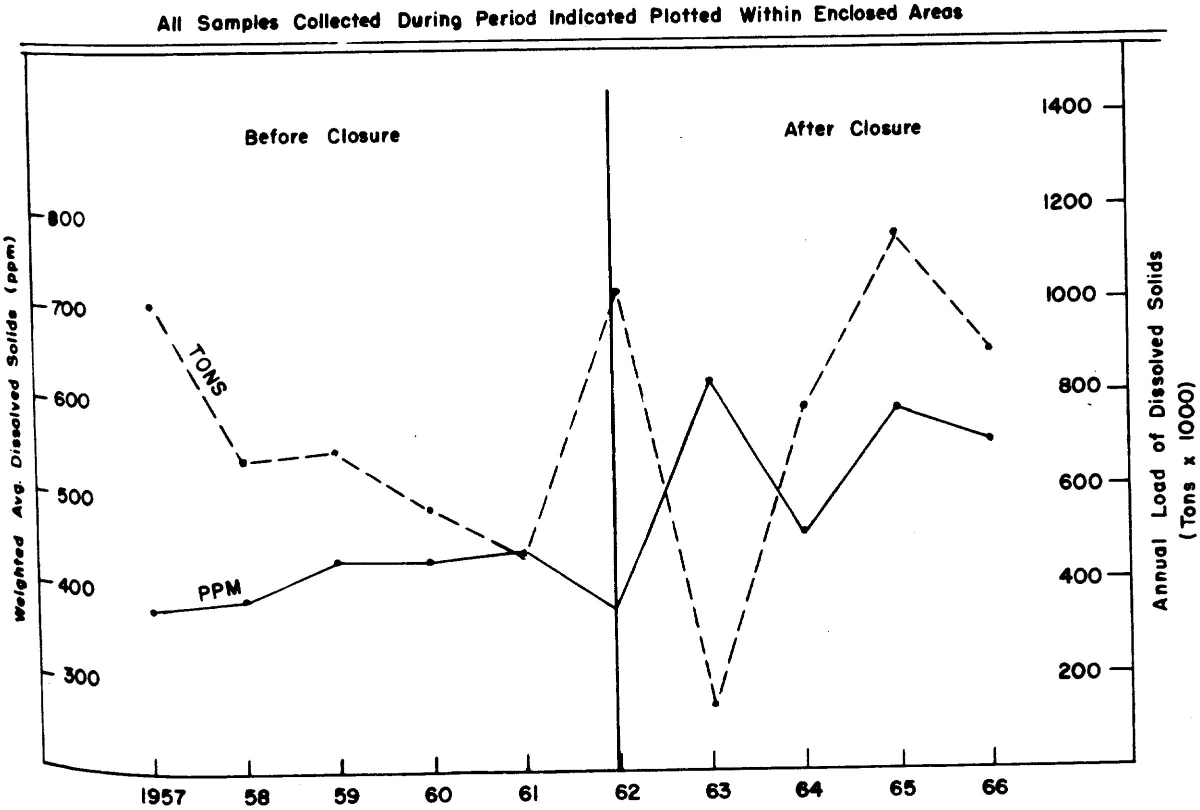
Table A
Quality data of minor tributaries to Flaming Gorge Reservoir

Stream	Discharge (c.f.s.)	Dissolved solids residue (ppm)	Predominant cation	Predominant anion
Bitter Creek	66.3	1,040	Na	SO_4
Little Firehole Canyon	0.1	5,310	Na	SO_4
Middle Firehole Canyon	< 0.1	3,100	Na	SO_4
Summers Dry Creek	28.7	381	Na	HCO_3
Sage Creek	1.5	1,510	Mg	SO_4
Currant Creek	2.9	566	Ca	HCO_3
Upper Marsh Creek	0.1	961	Na	SO_4
Middle Marsh Creek	0.1	996	Na	SO_4
Spring Creek	0.6	1,080	Na	SO_4
Birch Spring Draw	18	2,340	Na	SO_4
Sheep Creek	26.4	290	Ca	SO_4
Carter Creek	300	42	Ca	HCO_3
Dutch John Draw	0.1	518	Ca	HCO_3
Cart Creek	46.8	60	Ca	HCO_3

Initial effects of closure on the Green River downstream.--The closure of Flaming Gorge Dam has been too recent (November 1962) to allow a statement as to its ultimate effect on the chemical quality of the water downstream. Data for the first 4 years since closure indicate an initial increase in the average dissolved-solids concentration of the water at Greendale. The highest weighted average dissolved-solids concentration occurred in 1963 when a minimum of water was being released as the reservoir filled. During the next 3 years (1964-66) the amount of water released was larger but the annual outflow at Greendale was still less than the annual inflow. The annual weighted average dissolved-solids concentrations were less than in 1963 but greater than during the 6 years preceding closure (Figure 8). Information is not available on the chemical quality of the water below the reservoir prior to 1957 when construction of the dam began. Construction operations from 1957 to 1962 probably had some effect, and the concentration and load of dissolved solids in the Green River prior to the beginning of construction may have been slightly different from that for the 1957-62 period.

Although the average dissolved-solids concentration of Green River below the reservoir has increased, the seasonal fluctuation in concentration and chemical character is considerably less than it was before closure of Flaming Gorge Dam. The reported annual maximum concentration has shown no significant increase or decrease for the period of record. However, the annual minimum concentration has been considerably higher since 1963 (Table B). The annual range in dissolved solids was as much as 630 p.p.m. and the annual maximum dissolved-solids concentration was up to 6.2 times the annual minimum. For the period 1963-67, after closure, the annual maximum dissolved-solids concentration has not exceeded the annual minimum by more than 1.7 times. Prior to 1963 the water varied





WATER QUALITY OF GREEN RIVER NR. GREENDALE BEFORE AND AFTER CLOSURE OF FLAMING GORGE DAM

Fig. 8

Table B

Green River near Greendale before and after closure of Flaming Gorge Dam

	Before closure					After closure				
	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Mean discharge (ac.-ft. x 1,000)	1,310	1,190	973	781	2,019	170	1,258	1,437	1,189	
Dissolved solids1/										
Annual reported maximum (p.p.m.)	612	729	812	866	784	693	471	773	598	630
Annual reported minimum (p.p.m.)	98	268	316	236	262	427	419	461	471	543
Range (p.p.m.)	514	461	496	630	522	266	52	312	127	87
Ratio of maximum to minimum	6.2	2.7	2.6	3.7	3.0	1.6	1.1	1.7	1.3	1.2

1/ As reported in USGS Water Supply paper series, "Quality of Surface Waters of the United States" and "Water Resources Data for Utah, Part 2, Water Quality Records."

from a sulfate type during most of the year to a bicarbonate type during the spring runoff season. The water below the reservoir is now a calcium sulfate type throughout the year. Figure 4 shows the range in chemical composition of Green River at Greendale before and after closure.

In 1968 samples will be collected from the same sites that were sampled in October 1966. These data should give valuable information on changes with time in the chemical characteristics of water stored in the reservoir.

However, additional data need to be collected throughout the year to precisely define the type of limnological cycle which occurs in the reservoir. A longer term record than presently available is needed on the inflow and outflow loads to accurately determine the effects of Flaming Gorge Dam on the downstream sections of the Green River.

2. Lake Powell

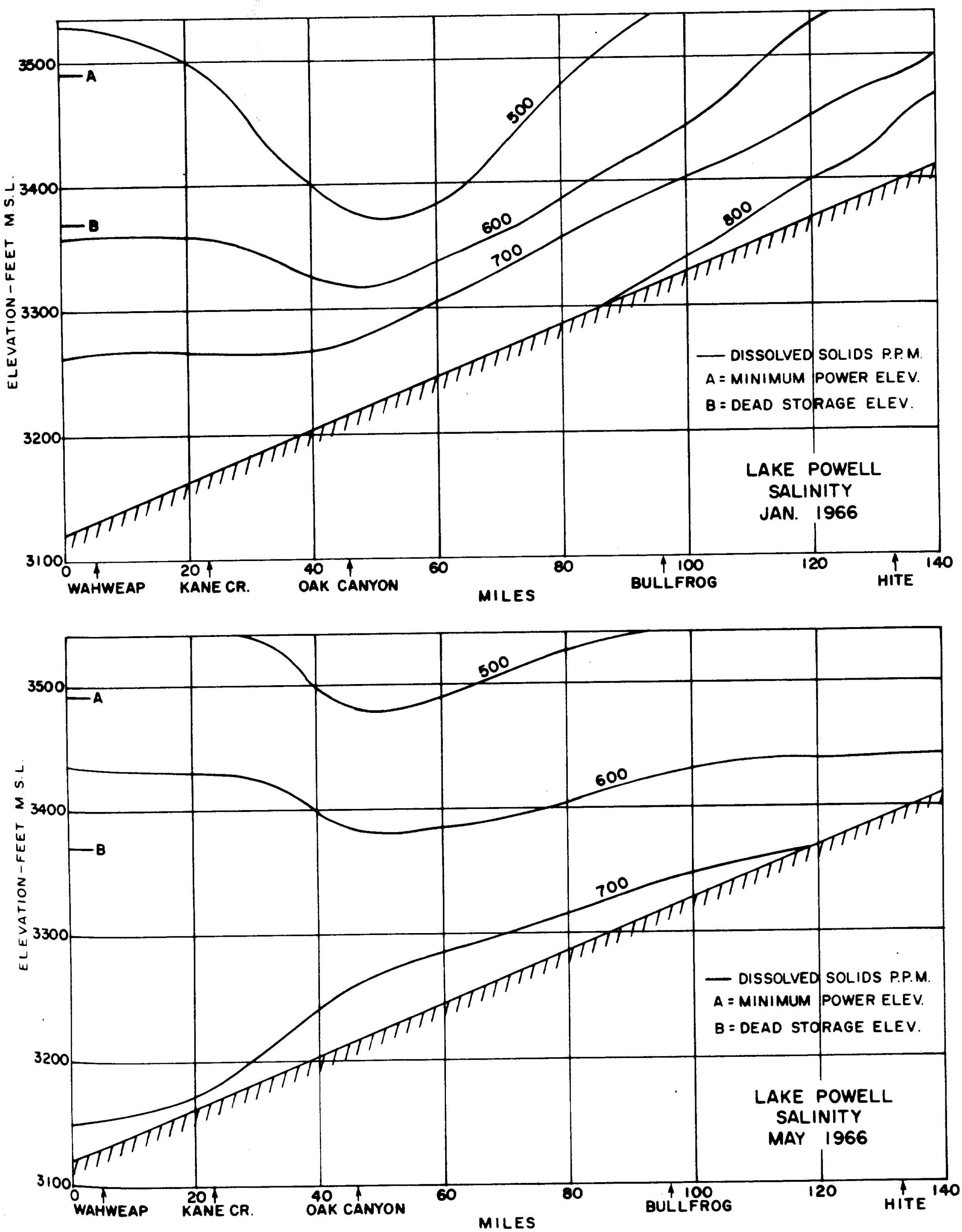
Water quality studies were started by the Bureau of Reclamation at Lake Powell in January 1965 as the lake was approaching inactive storage level. The program is to collect and analyze water samples four times a year at seven different locations. January, May, July, and October are designated as the months of collection and in addition samples are taken once a month at the mouth of Wahweap Creek. The samples are taken at 50-foot intervals to the bottom of the lake. Results of the sampling for 1966 are shown on the accompanying isohaline graphs.

The graphs show that for any point in the reservoir the salt concentration increases with depth. There is also a decrease in concentration near Oak Canyon, showing a dip in the curves. This is believed due to the influence of the less concentrated flows of the San Juan River entering about 7 miles above Oak Canyon. The January graph shows the concentration near the surface of the reservoir increasing toward the upper end of the reservoir. As the high flows in May with less concentration enter the reservoir, the higher concentrated water above Bullfrog becomes diluted. In July and on through October concentrations once again increase upstream due to the inflow of more highly concentrated water from the Colorado and Green Rivers during the summer and fall seasons.

The graphs also indicate that the less concentrated water is passed on through the powerplant penstock and on down the river.

F. Nonagricultural Sources of Salinity

Inspection of the flow and quality records reveals that along certain reaches of the Colorado River there are large increases in the dissolved-solids load that cannot be attributed to irrigation. Some of this



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A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
LAKE POWELL
SALINITY
JAN. 1966
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WAHWEAP
KANE CR.
OAK CANYON
BULLFROG
HITE
MILES
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— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
LAKE POWELL
SALINITY
MAY 1966
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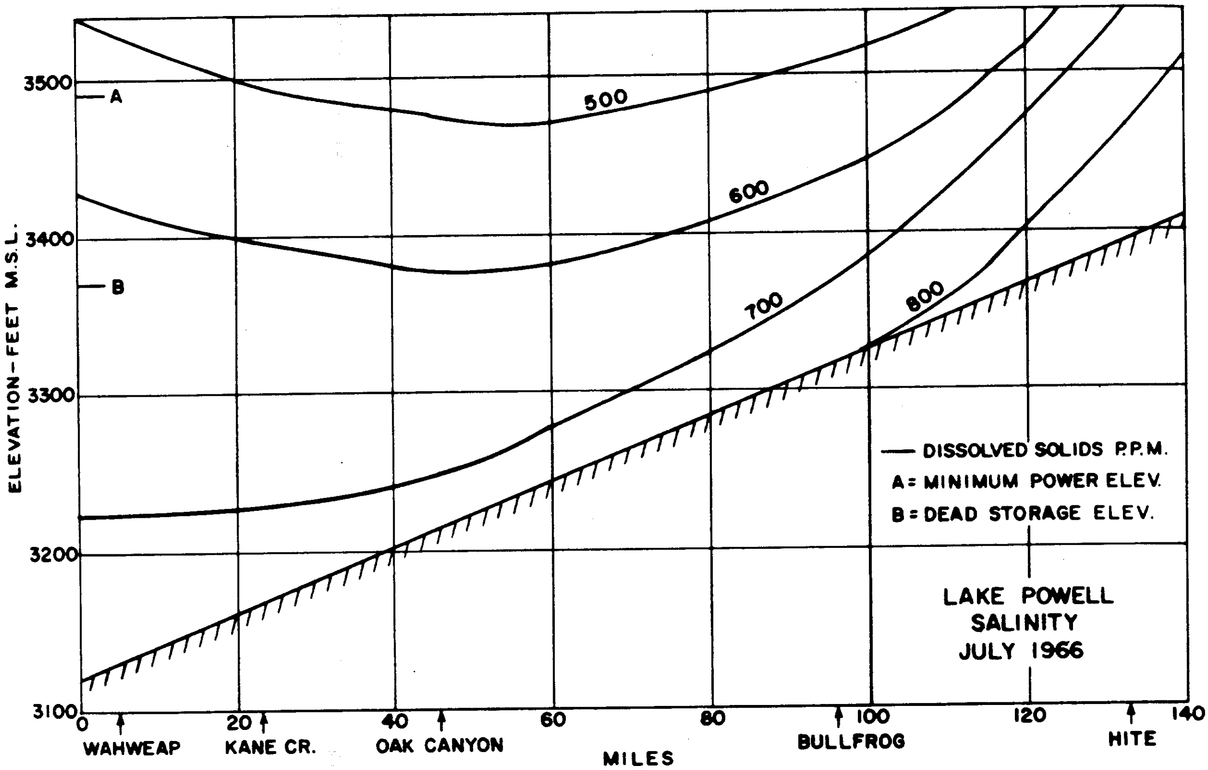
WAHWEAP
KANE CR.
OAK CANYON
BULLFROG
HITE
MILES

Fig. 9



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— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
LAKE POWELL
SALINITY
JULY 1966
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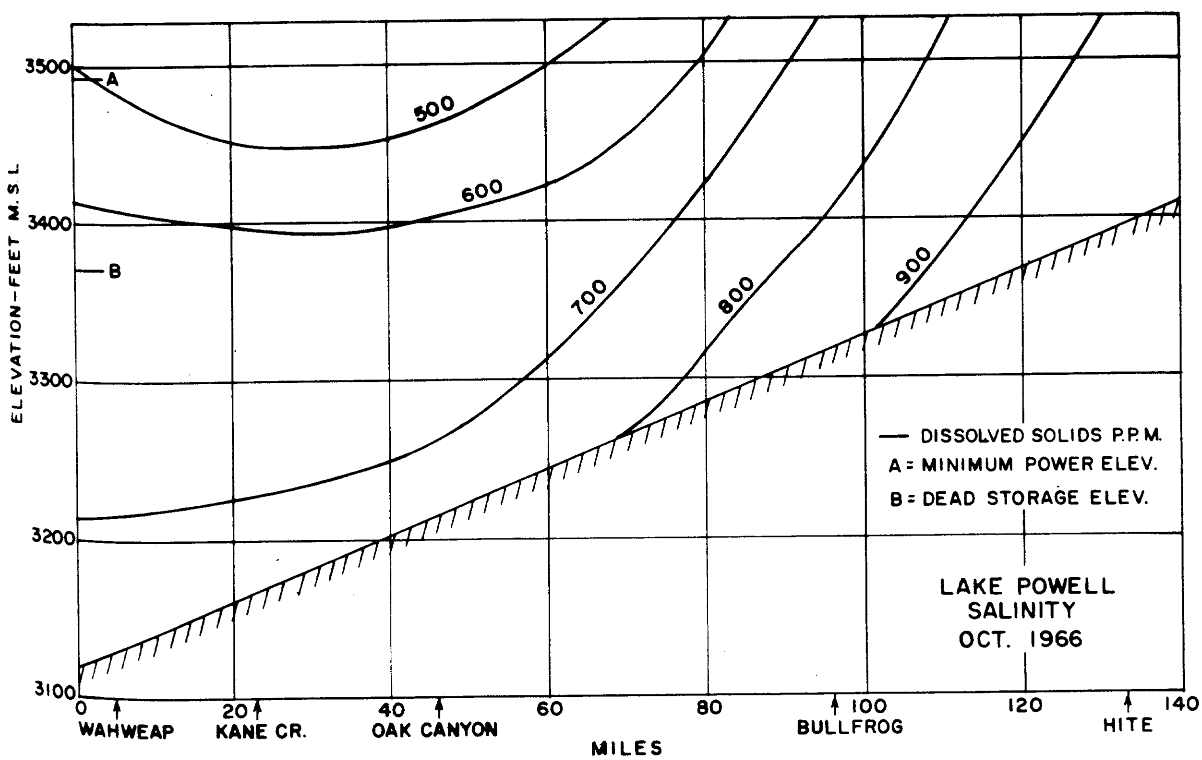
WAHWEAP
KANE CR.
OAK CANYON
BULLFROG
HITE
MILES



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— DISSOLVED SOLIDS P.P.M.
A = MINIMUM POWER ELEV.
B = DEAD STORAGE ELEV.
LAKE POWELL
SALINITY
OCT. 1966
0
20
40
60
80
100
120
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WAHWEAP
KANE CR.
OAK CANYON
BULLFROG
HITE
MILES

Fig. 10

increase is due to saline springs and wells in the Upper Basin (Tables C and D) and nonirrigated tributaries above Lake Powell, and some is contributed in the reaches Lees Ferry to Grand Canyon and Grand Canyon to Hoover Dam.

During 3 consecutive years (1949-51) when there was very little increase in water discharge between Lees Ferry and Grand Canyon, the dissolved-solids load increased about 1.3 million tons each year. During 1941 the discharge increased by about 1 million acre-feet, but the load increased by only 2 million tons. In 1952 the discharge increased by 0.2 million acre-feet and the load by 2.2 million tons. With the exception of these 2 years the annual increase in dissolved-solids load during the 26-year period has ranged from 0.5 million tons to 1.8 million tons.

In 1962 runoff of 14.4 million acre-feet at Lees Ferry increased by 400,000 acre-feet at Grand Canyon and the dissolved-solids load increased by half a million tons. By contrast, during the filling of Lake Powell the following year, only 1,384,000 acre-feet was recorded at Lees Ferry and the increase in flow at Grand Canyon amounted to 246,000 acre-feet, but the dissolved-solids load still increased by more than a half million tons. Likewise, with a small flow in 1964 the dissolved-solids load increased by nearly 900,000 tons.

Large amounts of dissolved solids also are added to the Colorado River between Grand Canyon and Hoover Dam. This does not result entirely from the solution of material in the bed of Lake Mead, but definition of specific sources along this reach of the river is difficult.

Past records also indicate an increase in salt load in the Lake Powell area above Lees Ferry and below the Green River, Cisco, and Bluff stations. Iorns and others (1965, p. 20) presented estimates of dissolved-solids loads in this river reach based on the period 1914-57 adjusted to 1957 conditions of development. Unaccounted inflow of dissolved solids in this reach amounted to about 5 percent of the load at Lees Ferry. Although the data in the tabulation on page 49 represent a different base period than used elsewhere in this report, they are sufficiently comparable to indicate the magnitude and relative importance of various sources of dissolved-solids inflow to Lake Powell.

Table C
Mineral and Saline Springs
Upper Colorado River Basin[1]

Spring and location	Flow (c.f.s.)	SO_4 (mg./l.)	Cl (mg./l.)	Concentration (mg./l.)	Concentration (tons/ ac.-ft.)	Total dissolved solids Tons/ day	Total dissolved solids Tons/ year	Flow (ac.-ft./ year)
Castle Creek Spring near Moab, Utah	0.245	1,290	1,460	4,390	6.0	2.9	1,060	177
Onion Creek Spring near Moab, Utah	0.122	1,830	4,000	9,120	12.4	3.0	1,100	88
Cold Kendall Spr. nr. Kendall Ranger Sta., Wyo.	1.400	1,300	1	2,100	2.8	7.9	2,880	1,014
Ragen Spring on Muddy Cr. west of Ft. Bridger, Wyo.	0.089	1,620	3,380	9,210	12.6	2.2	800	64
Dotsero Sprs. 1.5 mi. west of Dotsero, Colo.	17.000	450	5,800	10,700	14.5	500.0	182,600	12,308
Glenwood Sprs. area, Glenwood Sprs., Colo.	18.000	1,150	10,000	18,900	25.5	919.0	335,000	13,032
Steamboat Sprs. at Steamboat Sprs., Colo.	1.400	615	1,400	6,140	8.4	23.4	8,500	1,014
Lithia Spring, Steamboat Sprs., Colo.	0.022	460	1,350	5,770	7.8	0.3	110	16
Piceance Creek Spring, Meeker, Colo.	0.022	401	632	4,650	6.5	0.2	72	16
Trimble Hot Spring, Durango, Colo.	0.066	1,010	240	3,250	4.4	0.1	36	48
Pagosa Hot Spring, Pagosa, Colo.	2.300	1,500	173	3,240	4.4	20.0	7,300	1,665
Pinkerton Hot Spring, Durango, Colo.	0.500	635	1,010	3,670	5.0	5.0	1,820	362
Yellow Creek Spring, Rangely, Colo.	0.089	58	750	9,370	12.7	2.3	840	64
Ridgway Hot Spring, Ridgway, Colo.	1.000	1,460	103	2,850	3.9	7.0	2,550	724
Paradise Hot Spring, Dunton, Colo.	0.111	134	2,800	5,490	7.5	1.7	620	80
Big Sulphur Spring, Meredith, Colo.	0.333	1,390	1	2,250	3.1	2.0	730	241
Arsenic Spring, Crystal Mining Camp	2.000	1,350	2	2,030	2.8	11.0	4,000	1,448
Coal Mine Drainage, Oak Creek, Colo.	0.666	1,960	4	3,430	4.7	6.2	2,260	482
Seepage to Big Sandy Cr., Farson, Wyo.	0.133	3,340	37	5,600	7.6	2.0	730	96
Total	45.498					1,516.2	553,008	32,939

1/ List of springs limited to those with T.D.S. concentrations in excess of 2,000 mg./l.

Table D
Mineral and Saline Wells
Upper Colorado River Basin

Spring and Location	Flow (C.f.s.)	SO_4 (Mg/l)	Cl (Mg/l)	Concentration (Mg/l)	Concentration (T/AF)	Total Dissolved Solids (Tons/Day)	Total Dissolved Solids (Tons/Year)	Flow (Acre-feet/Year)
South Drain, Ashley Creek Oil Field, Vernal, Utah	2.200	1,540	96	2,670	3.6	15.9	5,800	1,593
Crystal Geyser, Green River, Utah	0.282	2,430	4,560	13,100	17.8	10.0	3,640	204
Oil Test Hole, Meeker, Colorado	3.100	3,010	8,720	18,900	26.0	160.0	58,400	2,244
Flowing Well near Aneth, Utah	0.133	1,980	763	4,560	6.2	1.6	580	96
Flowing Well 13.1 miles above mouth of Piceance Creek	0.355	11	554	17,900	24.4	17.2	6,280	257
Drainage, Iles Dome Oil Field near Loyd, Colorado	2.900	39	137	2,180	2.9	17.0	6,200	2,100
Total	8.970							6,494

Stream	Dissolved-solids load: Thousands of tons per year	Dissolved-solids load: Percentage of Colorado River at Lees Ferry
Colorado River near Cisco, Utah	4,120	47.7
Green River at Green River, Utah	2,652	30.7
San Rafael River near Green River, Utah	190	2.2
Dirty Devil River near Hite, Utah	198	2.3
Escalante River at mouth near Escalante, Utah	25	.3
San Juan River near Bluff, Utah	997	11.5
Other sources including ground water inflow	460	5.3
Colorado River at Lees Ferry, Arizona	8,642	100.0

More studies are needed to identify the magnitude of specific natural sources of salinity downstream from the confluence of the Colorado and Green Rivers.

The following section summarizes available information about the contribution of dissolved solids by various sources to the Colorado River between Glen Canyon and Hoover Dams.

1. Contribution of Salts to the River System by Springs and Tributaries

Table C summarized information about the contribution of water and dissolved salts by springs to the Upper Colorado River system. Recent studies in the Lower Basin by the Geological Survey and the Bureau of Reclamation have provided information about the contribution of springs to the Colorado River between Glen Canyon Dam and Lake Mead and to the Virgin River which drains into Lake Mead.

Between Glen Canyon Dam and Lake Mead numerous springs and small spring-fed tributary streams, as well as several large streams, contribute water and dissolved solids to the Colorado River. The largest contributors of dissolved solids are the Paria and Little Colorado Rivers and Bright Angel, Tapeats, Kanab, and Havasu Creeks. Records summarized in this report for the hydrologic data stations on the Colorado River at Lees Ferry (just upstream from Paria River) and near Grand Canyon (just upstream from Bright Angel Creek) indicate that each year slightly more than a million tons of dissolved solids are added to the Colorado River in this reach alone. About half of this increase can be attributed to springs in the lower 13 miles of the channel of the Little Colorado River. The Virgin River salinity contribution is principally from the LaVerkin Springs about 40 miles northeast of Littlefield, Arizona.

Paria River.--Iorns and others (1965, Table 10, p. 346) estimated that the Paria River contributed about 34,000 tons of dissolved solids and 23,000 acre-feet of water annually to the Colorado River. Their estimates were based on the period 1914-57, adjusted to 1957 conditions of development. For the 1941-66 period the average annual contribution is about 30,000 tons of dissolved solids and 18,800 acre-feet of water. Sulfate, calcium, sodium, and magnesium are the major dissolved constituents making up this dissolved-solids discharge.

Little Colorado River.--The water discharge of the Little Colorado River near Cameron, Arizona, which is above Blue Spring, has ranged during 1948-64 from 19,260 acre-feet in 1956 to 347,600 acre-feet in 1952. The average for the 17-year period is 134,300 acre-feet. An estimated annual dissolved-solids discharge of 130,000 tons appears reasonable for the Little Colorado River Basin upstream from Blue Spring. This estimate is based on chemical-quality records collected at Cameron which is upstream from the gaging station and from Moenkopi Wash.

Blue Spring is in the bed of the Little Colorado River about 13 miles upstream from its mouth at approximately 36°07' N. latitude and 111°42' W. longitude. Other springs discharge into the channel of the Little Colorado River throughout a 10-mile reach downstream from Blue Spring. Measurements of water discharge near the mouth of the Little Colorado River made at times when the river was dry at the gaging station near Cameron, Arizona, (mile 45.5) indicate that the combined flow of the springs is constant. The average discharge, based on 10 measurements from June 1952 to May 1966, was 222 cubic feet per second. This discharge results in a contribution of 161,000 acre-feet of water annually to the Colorado River.

A recent chemical analysis of water collected on June 21, 1965, about 1 mile upstream from the mouth of the Little Colorado River is given below.

Silica (SiO_2), p.p.m.	17
Calcium (Ca), p.p.m.	91
Magnesium (Mg), p.p.m.	64
Sodium (Na), p.p.m.	780
Potassium (K), p.p.m.	35
Bicarbonate (HCO_3), p.p.m.	396
Sulfate (SO_4), p.p.m.	163
Chloride (Cl), p.p.m.	1,220
Fluoride (F), p.p.m.	0.2
Dissolved solids (residue at 180° C.), p.p.m.	2,500
Tons per acre-foot	3.4
Tons per day at 222 c.f.s.	1,500
Hardness as $CaCO_3$, p.p.m.	490
Noncarbonate hardness as $CaCO_3$, p.p.m.	166
Sodium adsorption ratio	15
Specific conductance (micromhos per cm. at 25° C.)	4,520
pH (field)	8.2

Because the river had not flowed at the gaging station near Cameron, Arizona, for several weeks prior to June 21 and because the measured water discharge was 220 c.f.s., the sample is considered to be representative of combined spring inflow in the lower reach of the Little Colorado River. Estimates of dissolved-constituent contribution from these springs, using the above data and an annual water discharge of 161,000 acre-feet, are shown on the following page.

Constituent	Tons per year
Silica	3,700
Calcium	19,900
Magnesium	14,000
Sodium	171,000
Potassium	7,700
Carbonate	42,700
Sulfate	35,700
Chloride	267,000
Dissolved solids (residue on evap.)	547,000

Bright Angel Creek.--Bright Angel Creek enters the Colorado River just downstream from the hydrologic data station near Grand Canyon. The average annual water discharge (41 years of record) of Bright Angel Creek at its mouth is 25,630 acre-feet and is mostly from springs near the North Rim of the Grand Canyon. The base flow has been estimated as 15,000 acre-feet per year. Records of water quality indicate that the average dissolved-solids concentration is about 0.27 tons per acre-foot and that calcium, magnesium, and bicarbonate are the major dissolved constituents. The annual contribution of dissolved solids from Bright Angel Creek to the Colorado River is about 7,000 tons.

Tapeats Creek.--Tapeats Creek is fed by springs in its headwaters and by Thunder Spring, the source of water for its major tributary, Thunder River. Simultaneous measurements of water discharge at the mouth of Tapeats Creek and at the mouth of Bright Angel Creek indicate a good correlation of streamflow (R. B. Sanderson, written communication, 1963) and thus permit application of the long-term streamflow record for Bright Angel Creek to estimate the discharge of Tapeats Creek. By use of this correlation the average annual discharge of Tapeats Creek is estimated to be about 58,000 acre-feet.

Only few determinations of water quality of Tapeats Creek at its mouth have been made. These data indicate that the water is of the calcium, magnesium, bicarbonate type, and is of low mineralization.

Date	Water discharge (c.f.s.)	Dissolved solids (tons per acre-foot)
6-27-51	59.7	0.24
6-18-60	51.4	.39
6-22-65	80 (est.)	.16
6-25-65	79.8	.20

If the average dissolved-solids concentration of water at its mouth is 0.2 ton per acre-foot, Tapeats Creek contributes about 12,000 tons of dissolved solids annually to the Colorado River.

Kanab Creek.--Kanab Creek has a drainage area of about 1,600 square miles, of which about 1,000 square miles is in southern Utah. The few measurements of water discharge and water quality made at the mouth of Kanab Creek are as follows.

Date	Water discharge (c.f.s.)	Dissolved solids (tons per acre-foot)
9-11-23	3.8	--
6-10-53	3.83	--
6-19-60	4.10	1.56
6-22-65	12 (est.)	1.60
6-25-65	4 (est.)	1.44

Calcium, magnesium, and sulfate are the principal dissolved constituents.

Assuming that the base flow of Kanab Creek at its mouth is about 4 c.f.s. and that the corresponding dissolved-solids concentration is about 1.5 tons per acre-foot, the minimum annual contribution of dissolved solids from Kanab Creek to the Colorado River can be estimated as 4,500 tons.

Havasu Creek.--Havasu Creek drains the Coconino Plateau south of the Colorado River and enters the river about 13 miles downstream from Kanab Creek. Two determinations of water quality at the mouth of Havasu Creek indicate that the water is of the calcium, magnesium, bicarbonate type and that its dissolved-solids concentration is 0.5 ton per acre-foot. Available data are summarized as follows:

Date	Water discharge (c.f.s.)	Date	Water discharge (c.f.s.)
9-13-23	1/ 74.5	6-12-52	62.9
5-20-50	60.0	6-13-52	65.7
10-20-50	63.8	6-22-65	3/ 65 (est.)
6-14-51	59.3	6-25-65	60 (est.)
6-16-51	2/ 63.3	12-28-66	66.6

1/ Probably includes some inflow to canyon above springs.
2/ Dissolved-solids concentration was about 0.5 ton per acre-foot.
3/ Dissolved-solids concentration was 0.48 ton per acre-foot.

If the base flow of Havasu Creek is 65 c.f.s. (47,000 acre-feet per year) and the average dissolved-solids concentration is 0.5 ton per acre-foot, a minimum annual contribution of 24,000 tons of dissolved solids can be estimated to reach the Colorado River from Havasu Creek.

Other tributaries between Glen Canyon Dam and Lake Mead.--Many small springs and spring-fed tributaries also contribute dissolved solids to the Colorado River, but information about the water discharge and chemical quality of these inflows is sparse. In recent years, however, several parties of Interior Department scientists and engineers have made observations of water discharge and collected water-quality data during trips down the Colorado River.

Virgin River.--The dissolved-solids discharge of the Virgin River at Littlefield, Arizona, is about 350,000 tons per year (see Table 15). Although much of the water and dissolved solids is diverted for irrigation between Littlefield and the mouth of the river in Lake Mead, the dissolved solids eventually reach Lake Mead.

Of the springs which discharge into the Virgin River and its tributaries, the largest contributor of dissolved solids probably is LaVerkin Springs ("Dixie Hot Springs"). These warm (105-107° F.) springs dischage into the river in a reach several hundred yards long about 40 miles northeast of Littlefield, Arizona. Some of the springs rise in the bed of the river, and others discharge from the sides of the canyon walls in the Hurricane Fault zone.

In recent years several measurements of water discharge have been made just downstream from the springs when the entire flow of the Virgin River upstream from the springs was being diverted. These measurements ranged from 10 to 11 c.f.s. and indicate that the flow of the springs does not vary appreciably. The chemical quality of the combined spring inflow is relatively constant as indicated by analyses of samples collected at the time discharge measurements were made. A typical analysis of the total inflow of the springs is given below. The sample was collected on August 31, 1960, when the river was dry upstream from the springs.

Analysis of LaVerkin Springs, August 31, 1960

Silica (SiO_2), p.p.m. . . .	28
Calcium (Ca), p.p.m. . . .	590
Magnesium (Mg), p.p.m. . .	148
Sodium (Na), p.p.m.	2,490
Potassium (K), p.p.m. . . .	177
Bicarbonate (HCO_3), p.p.m.	583
Sulfate (SO_4), p.p.m. . . .	2,050
Chloride (Cl), p.p.m. . . .	3,610
Fluoride (F), p.p.m. . . .	2.1
Nitrate (NO_3), p.p.m. . . .	3.2
Boron (B), p.p.m.	5.0
Dissolved solids (residue at 180° C.), p.p.m. . .	9,350
Tons per acre-foot . .	12.8
Tons per day at 10.6 c.f.s. discharge . .	269
Hardness as $CaCO_3$, p.p.m.	2,080
Noncarbonate hardness as $CaCO_3$, p.p.m.	1,600
Sodium adsorption ratio .	24
Specific conductance (micromhos per cm. at 25° C.)	13,500
pH	7.4
Density g. per ml. at 20° C.	1.005

Using the above data, the annual contribution of LaVerkin Springs is estimated as 7,700 acre-feet of water and 98,000 tons of dissolved solids which include principally sodium (26,000 tons), sulfate (22,000 tons), and chloride (38,000 tons).

2. Summary of Contribution by Springs and Tributaries

Major springs and spring-fed tributaries annually contribute a minimum of almost 800,000 tons of dissolved solids to the Colorado River between Glen Canyon Dam and Lake Mead. Storm runoff in small tributaries in this reach of the Colorado River contribute an unknown, but probably much smaller, load to the river. The contribution of dissolved solids by major sources of inflow between Glen Canyon and Lake Mead represents about 10 percent of the average dissolved-solids load of the Colorado River at Lees Ferry. Springs in the lower Little Colorado River contribute about half of the measured increase in dissolved-solids discharge in the Colorado River between Lees Ferry and Grand Canyon.

LaVerkin Springs discharge almost 100,000 tons of dissolved solids annually to the Virgin River; this contribution is about one-fourth of the measured dissolved-solids discharge of the Virgin River at Littlefield, Arizona.

The annual dissolved-solids contributions of major springs, streams, and spring-fed tributaries to the Colorado River between Glen Canyon Dam and Lake Mead and to the Virgin River are summarized in the following tabulation.

Source	Dissolved-solids discharge in thousands of tons per year	
Colorado River at Lees Ferry, Arizona	8,141	-
Paria River	-	30
Little Colorado River above Blue Spring	-	130
Springs in Lower Little Colorado River	-	550
Subtotal	-	710
Colorado River near Grand Canyon, Arizona	9,291	-
Bright Angel Creek	-	7
Tapeats Creek	-	12
Kanab Creek (base flow)	-	4
Havasu Creek (base flow)	-	24
Subtotal	-	47
Total inflow in Colorado River	-	757
LaVerkin Springs	-	98
Virgin River at Littlefield, Arizona	350	-
Total inflow to Colorado and Virgin Rivers	-	855

The minimum annual inflow of 855,000 tons from these sources result in an increase in dissolved-solids concentration of about 60 parts per million

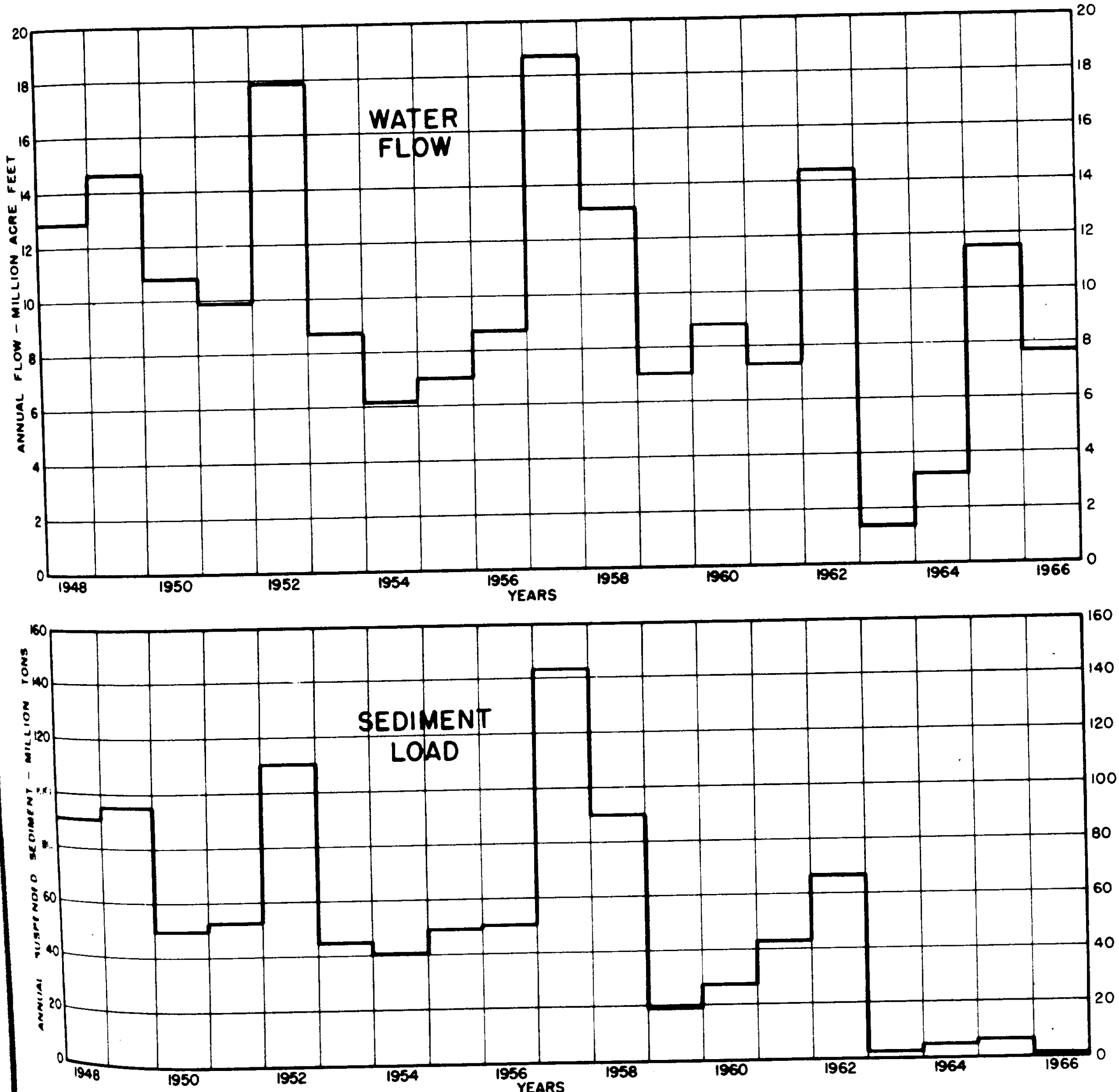
(0.08 ton per acre-foot) in the Colorado River, on the basis of an annual flow of 11,000,000 acre-feet.

G. Sedimentation Studies

Prior to construction of the storage units of the Colorado River Storage Project, most of the larger tributaries and the main stem of the Colorado River carried large loads of suspended sediment in their middle and lower reaches. This sediment was detrimental to diversions of water for consumptive use as well as to high-type fishery and other recreational uses. The construction of Fontenelle, Flaming Gorge, Navajo, and Glen Canyon Dams has produced dramatic changes in the streams immediately below the reservoirs and the effect has been felt to a lesser degree far downstream. Regulation of the Green River at Fontenelle Dam has cleared up the Green River to a point where much of the intervening reach between Fontenelle Dam and the headwaters of Flaming Gorge has changed to a relatively clear trout water fishery. Release of cold, clear water during the entire year through turbines at Flaming Gorge has converted the section of the Green River immediately below Flaming Gorge into one of the best fishing and boating streams in the general area. Float trips on rubber rafts are especially enjoyed by the public in the miles between Flaming Gorge Dam and Little Hole. Storage of sediment in Navajo Reservoir produces marked changes in the first few miles below the dam, but the numerous arroyos soon contribute another sediment load for the San Juan River to transport.

The 15-mile reach of the Colorado River between Glen Canyon Dam and Lees Ferry, Arizona, has literally become a trout stream fishery oasis in the desert. Immediately upon final closure of Glen Canyon Dam, this spectacular canyon section was planted with trout and overnight developed into a mecca for stream fishermen.

Suspended sediment loads of the Colorado River at Lees Ferry, Arizona, have been measured with some interruption since 1929. In that water year 352 million tons of suspended sediment passed the gaging station. The load dropped to 2.2 million tons in calendar year 1963 after Glen Canyon Dam was closed and the outflow from the dam was severely restricted in order to obtain initial storage in Lake Powell. Suspended sediment transport and waterflow continued low through 1964. Minimum power head was attained in late 1964, so flows were stepped up to the point where 11,500,000 acre-feet passed the Lees Ferry gage in calendar year 1965. Conversely only about 5.9 million tons of sediment passed the gage. In 1966, 7,700,000 acre-feet of water passed the Lees Ferry gage. Only an intermittent sampling of sediment was made and therefore an accurate total load was not available. From the intermittent sampling (1 to 4 samples a month) it was estimated that only about 400,000 tons of sediment passed the Lees Ferry gage. Figure 11 shows the relationship between water and sediment flow at Lees Ferry during the period 1948-66.



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLORADO RIVER
AT LEES FERRY
SEDIMENT & WATER FLOW

Fig. 11

Another interesting event is reflected on the graph in 1959 when the cofferdam was finished and diversions through the tunnels began. Sediment was deposited behind the cofferdam in 1959 and 1960, but the available volume was filled and the cofferdam lake gradually lost its effectiveness so passage of sediment measured at Lees Ferry built up to 67 million tons in 1962.

Clear water released from Lake Powell also degraded and stabilized the channel below Glen Canyon Dam during this period. Clear water was also observed flowing into Lake Mead during some periods.

Lake Powell and other CRSP reservoirs will effectively trap and store almost all of the sediment originating in the Upper Colorado River Basin. Lake Powell will trap approximately 80 percent of the sediment that formerly flowed into Lake Mead.

Suspended sediment records are being obtained at key locations to measure the changes that are taking place as use and regulation of the stream system progresses. Some of these stations are shown in Tables 39 to 44 and include Green River near Jensen, Utah; Green River at Green River, Utah; Colorado River near Cisco, Utah; San Juan River near Bluff, Utah; Colorado River at Lees Ferry, Arizona; and Colorado River near Grand Canyon, Arizona. These tables show by calendar years the monthly flow, weighted concentration in p.p.m., and the suspended load of sediment.

PART VI. QUALITY OF WATER

A. Historic Condition

The historic dissolved-solids concentration at 18 key stations in the Colorado River Basin is shown in Tables 1 to 18 for the 1941-66 period. The Lees Ferry and Grand Canyon stations have been subjected to extremely abnormal conditions during the 1959-66 part of that period because of low runoff in 1959, 1960, and 1961 and because of filling Lake Powell in 1963 to 1966. The recorded flow at Lees Ferry in 1963 was 1,384,000 acre-feet and 3,244,000 acre-feet in 1964 and the dissolved-solids concentration was 1.27 and 1.10 tons per acre-foot, respectively; however, the average concentration remained at 0.74 ton per acre-foot for both the 1941-61 and the 1941-66 periods. The concentration at Grand Canyon remained the same for both periods also.

The addition of 2 more years of quality of water data shows very little average change from the 1941-64 period used previously. Nine of the stations show no change; at seven the concentration increased by 0.01 ton per acre-foot, and at one it increased by 0.02 ton per acre-foot. The average concentration for the other, the Virgin River station, for the period 1941-64 was 2.27 tons per acre-foot while the average concentration for the period 1941-66 was 2.26 tons per acre-foot.

The average concentration at Grand Canyon for the 1941-66 study period is 0.83 ton per acre-foot as shown by Table 14. Quality records are complete for the Grand Canyon station from 1926 to 1940 also, and the average concentration for that period was 0.81 ton per acre-foot. It would appear that any developments that have taken place in the upper portion of the Colorado Basin above Grand Canyon during the last 40 years have had a very small effect on the weighted-average dissolved-solids content of the water of the Colorado River.

The extremely low flows in the river below Lees Ferry during Lake Powell filling (1,384,000 acre-feet in 1963 and 3,244,000 acre-feet in 1964) combined with the normally high discharge of dissolved solids from Blue Springs on the Little Colorado River caused the concentrations at Grand Canyon to be high. In spite of this the average concentrations at Grand Canyon are only 0.09 ton per acre-foot higher in 1963 than in 1934, which was the previous year of the lowest runoff.

The increase in total dissolved solids in the Lower Colorado River Basin since 1963 has caused some concern but a close look at the historical record shows that the increase would not be permanent and that similar increases have been experienced in the past. The concentrations of dissolved solids in the water below Hoover and Parker stations began to increase from the 650-700 p.p.m. range in early 1964 to the 750-800 range during 1965 and the first half of 1966. In mid-1966 the concentration began to decrease and toward the end of 1967 it was again down in the 650-700 p.p.m. range at both stations.

The historical record for the 1955-57 period shows that the situation was even worse at that time with the concentrations going higher and staying higher for a longer period of time. The high concentrations during both periods were primarily caused by low runoff in the Colorado River with the 1965-66 increase at the Hoover and Parker stations being aggravated by the filling of Lake Powell and other upstream reservoirs. The historical concentration at Lees Ferry was back down to 515 p.p.m. in 1966, which is the lowest at that station since 1957. This compares with an average high of 934 p.p.m. in 1963 during an extremely low runoff year. Because of the large storage capacity at Lake Mead and Lake Powell there is a considerable timelag in water passing through a reservoir so the better quality water released from Lake Powell in 1966 will probably not reach the stations below Hoover Dam until late 1967 and early 1968.

Between Parker and Imperial Dams there is a further net decrease of 624,000 acre-feet in the average discharge but a net increase of 386,000 tons per year of total dissolved solids.

The concentration of dissolved solids in the Virgin River at Littlefield, Arizona, is high but the discharge is small. The higher concentration increases the overall concentration of water discharged from Lake Mead by about 0.02 ton per acre-foot.

B. Ionic Loads

Annual summaries of the ionic loads in tons-equivalent for the 1941-66 period have been included in this report to further depict quality conditions at various key stations. The tables give ionic loads for the six principal ions. The amount of potassium is negligible and carbonates are generally not present.

A study based on the various ions inflowing to the Lake Powell area from the Colorado, Green, San Rafael, and San Juan Rivers has been made for comparison with the ionic load data at Lees Ferry. The resultant data represent conditions prior to storage in Lake Powell. Similar data collected after storage begins will permit comparison of conditions both before and after storage and will provide information about changes in concentration of ions in the reservoir basin resulting from storage. One difficulty that becomes apparent from this study is that the percentage of change in ionic load is frequently within the limits of error for streamflow and quality measurement.

The ionic changes according to the study average as follows.

QUALITY OF WATER

Ion	Percentage increase at Lees Ferry over sum of upstream tributaries
Calcium	12
Magnesium	5
Sodium	2
Bicarbonate	7
Sulphate	7
Chloride	9
Total dissolved solids	8

C. Present Modified Condition

Present modified flow, as defined for this report, is the flow expected at any point with all upstream existing projects in operation for the full period of study. It was estimated at the various stations by assuming a recurrence of past water supply conditions and by deducting from the annual historical flows the depletions that would have resulted from the operation of all upstream projects constructed and in operation since that year. It should be noted that, when a project becomes fully operational, the streamflow record reflects the depletion and present modified flow becomes equal to historical flow.

Historical flows since 1941 have been affected by the transmountain diversions of the Colorado-Big Thompson Project, Duchesne Tunnel of Provo River Project, Roberts Tunnel of the City of Denver, and a number of small inbasin developments. More recently the Collbran, Paonia, Smith Fork, Florida, and Hammond Projects and Vernal Unit of Central Utah Project have come into operation. Also, evaporation from the storage units--Glen Canyon, Flaming Gorge, Navajo, and Curecanti--is now in effect along with the Hayden steamplant, Utah Construction Company steamplant, expansion of Hogback lands, and the municipal and industrial uses in Wyoming. The depletions from these projects have been extended back to 1941, from the time they became operational, so that when new projects are imposed on the present modified condition the anticipated effects can be estimated. In the near future additional evaporation will be in effect from the storage units, and several projects now under construction will become operational. The addition of these new depletions results in slight increases in dissolved-solids concentrations under present modified conditions over the 1941-64 period.

After the present modified flows were computed, the quality data were extended to give the expected quality for the study period. Quality data were computed by taking into consideration the weighted average of the concentrations of total dissolved solids for the various transmountain diversions. Also, the change in dissolved solids resulting from the inbasin developments was computed on the basis of an assumed pickup of 2.0 tons of dissolved solids per acre of irrigated land and a depletion of 1.5 acre-feet of water per irrigated acre.

Comparison of the historic and present modified flow columns of Tables No. 1 to 18 indicates that flow is less and the concentrations greater under present modified conditions than under historic conditions. For those drainage basins where no significant development had taken place during the 26-year period, the flow and quality data were considered to be the same under historic and present modified conditions.

As in the previous reports, present modified flows are used as a basis for developing the anticipated effect of the storage units, participating projects, and other developments.

D. Industrial Wastes

Discharge of industrial and mine wastes into the Colorado River system has only been of local concern and not an overall major problem in the past. With continued increase in industrial development expected, this source of pollution could become an important factor in the quality of water for downstream uses. Present and potential industrial wastes include those from uranium, coal, silver, lead, trona, and other mines and mills, railroad yards, manufacturing plants, meat and food packing plants, petroleum and oil shale industries, steam powerplants, and many other industries. Pollutants derived include dissolved solids, oils and grease, floating debris, tailings, chemicals, radioactive substances, packing plant wastes, cooling water, and other matter which would cause color, odor, or taste, or be toxic or interfere with the beneficial use of the water.

The recent establishment of state standards and enforcement of them should have a marked effect on curtailing industrial waste inputs as they are point sources of pollution and can be fairly well controlled.

E. Municipal Problems

Part of the water supply of municipalities is used to transport waste products for disposal to nearby streams. Within the Colorado River Basin most of the sewage discharges reenter the river system. Although some of the wastes from these sources are treated for removal of organic matter and purification, the treatment does not remove the dissolved solids. Numerous communities within the Colorado River drainage area had either no treatment or only primary treatment facilities as of December 1965.

Recent legislation controlling pollution from these sources together with available Federal grants has resulted in improvements or in installation of secondary or complete sewage treatment plants in many of these communities. It is anticipated that future enforcement of state standards will result in the control of pollution from these sources.

F. Temperature Effects

Temperature changes can be due to man-introduced industrial wastes, return of other water uses, natural climatic conditions, or storage in large reservoirs. Temperature increases can cause undesirable stream and reservoir conditions such as decreased oxygen capacity, increased oxygen demand, growth of fungus and odor-producing organisms. Many state and interstate water pollution control organizations include in their standards restrictions on temperatures or increases in temperatures. The inclusion of water temperature restrictions in state standards has resulted in creating some problems associated with irrigation, municipal and industrial, and other types of water use developments. When late summer flows are diverted for these purposes, the diminished flow of the stream is affected to a greater degree by heating from natural inflows, irrigation return flows, industrial wastes, and sunlight than would be the case under full flow conditions.

Temperature increases in the Colorado River Basin due to industrial wastes have been minor. This source of heat, however, should be controlled as future industrial growth occurs in the basin. Temperature increases due to irrigation return flows have not been a problem and are not expected to be a major problem in the Colorado River Basin except possibly where river flows have been greatly depleted as previously mentioned.

Storage and release of water from Flaming Gorge, Lake Powell, Navajo, and the Curecanti Reservoirs resulted in temperature changes in the river reaches below the dams. The general effect of storage release is to increase the temperature during the winter and decrease it in the summer, thus reducing extreme variations. It has been reported that the maximum temperature that trout can tolerate is about 80° F. with an optimum temperature of about 55° F. for maximum rate of growth and reproduction. The lowering of the summer temperatures due to released water from storage is partial reason for the excellent trout fishing conditions now existing in these reaches.

Temperature variations near Grand Canyon are similar to those at Lees Ferry while those for the Virgin River near Littlefield apparently show the effects of the LaVerkin Springs as winter and spring temperatures remain higher than those of the Colorado River near Grand Canyon.

QUALITY OF WATER

Temperature effects below Hoover Dam are similar to those below Glen Canyon Dam in that extreme variations have been eliminated. Apparently the operation of Lake Powell has not produced any change in the release temperature of the water below Hoover Dam. According to the temperature records, the average temperature has remained almost constant before, during, and after filling Lake Powell. In the reach below Parker Dam the temperature variation during the year is more extreme than below Hoover Dam due to less water depth and water content in the reservoir. At Imperial Dam the winter temperatures remain about the same as below Parker Dam while the summer temperatures increase up to around 86° F. Tables E through J show the temperature of the water for the Colorado River at stations from Lees Ferry to Imperial Dam and the Virgin River.

Table E
Temperature of water
Colorado River at Lees Ferry, Arizona
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1949								76	72	58	47	37	290	
1950	36	42	49	58	62	68	77	77	70	62	48	40	689	57
1951	36	40	48	59	63	67	78	77	70	58	44	36	676	56
1952	35	39	45	54	61	67	75	78	70	63		37*	624	
1953	36	41	49	57	61	67*	80	78		61	47	36	613	
1954	37	44	48	63	68	74	80	76	71	61	48	37	707	59
1955	34	36	46	54	61	69	76	79	70	60	46	40	671	56
1956	41	40	48	57	63	70	78	74	72	60	42	36	681	57
1957	38	45	52	57	61	67	73	75	68	59	44	38	677	56
1958	36	45	49	55	63	69	76	80	71	65	49	40	698	58
1959	37	45	52	65	74	82	83	74	70*				582	
1960										59	48	38*	145	
1961	34*	42*	51*	59	66	75	80*	79	67*	56*	45*	36*	690	58
1962	34*	40*	46	57*	60*	68*	76*	77	72	61	50*	40*	681	57
1963	34*	40	48*	50*	56*	58*	63*	67*	66*	63*	60*		605	55
1964	47*	45*	46*	45*	50*	56*	60*	56	74*	70*	61*	56*	666	56
1965	52*	50*	50*	50*	51*	55*	67*	68*		67*	52*	42*	604	
1966			58*	52	53	58	64	65	65	63*	57*	50*	585	
Total	567	634	785	892	973	1,070	1,186	1,256	1,048	1,046	788	639	10,884	
Mean	38	42	49	56	61	67	74	74	70	62	49	40		

*Based on incomplete records.

Table F
Temperature of water
Colorado River near Grand Canyon, Arizona
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1941	41	46	51	55	63	69	76	77	68	58	41	40	685	57
1942	37	40	47	57	60	68	77	77	70				533	
1943										62	47	43	152	
1944	39	43	50	57	65	69	78	77	73	63	50	39	703	59
1945	39	44	48	56	64	66	72	76	69	62*	44*	36	676	56
1946	36	39	46	61	64	71	78	77	75	58	46	41	692	58
1947	35	43	52	58	65	68	76	77	73	62	46	39	694	58
1948	36	39	47	55	63	70	79	77	74	62	46	39	687	57
1949	36	37*	49*	59*	66*	71	79	78	74	60	50	40	699	58
1950	37	43	50	58	64	71	79	76	71	64	50	42	705	59
1951	39	42	50	59	65	71	79*	77	72	60	47*	38*	699	58
1952	37	41	46	57	65	71	78	79	71	63	50	38	696	58
1953	39	41	50	58	62	68	79	77	72	61	50	38	695	58
1954	38	45	50	62	69	72	80	77	72	62	50	40	717	60
1955	37	37	47	55	63	70	78	79	73	64	50	42	695	58
1956	44	43	50	59	67	73	78	75	75	63	45	37	709	59
1957	39	45	51	57	62	67	74	78	70	62	47	39	691	58
1958	37	45	48	56	63	70	76	79	71	63	49	39	696	58
1959	37	42	50	62	67	73	79	78	72	60	49	40	709	59
1960	36	41	50	58	65	73	80	79	75	62	50	40	709	59
1961	37	44	51	57	64	75	79	78	69	58	45	38	695	58
1962	35	40	45	56	60	69	74	77	73	62	53	43	687	57
1963	36	40	49	59	63	69	75	77	72	65	55	46	706	59
1964	44*	45	47	49	61	71	77	70	70	68	58	50	710	59
1965	50	49	50	52	54	58	69	70	68	65	60	53	698	58
1966	48	48	50	54	58	62	68	70	70	64	58	48	698	58
Total	969	1,062	1,224	1,426	1,582	1,735	1,917	1,912	1,792	1,553	1,236	1,028	17,436	
Mean	39	42	49	57	63	69	77	76	72	62	49	41		58

*Incomplete record.

Table G
Temperature of water
Virgin River at Littlefield, Arizona
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1947										60*	51	46	157	
1948	46	49	52	58	63	71	72	70	68	62	52	48	711	59
1949	42	46	55	60	64	72	72	69	68	61	54	47	710	59
1950	46	51	56	61	67	69	76	72	69	65	56	53	741	62
1951	49	54	58	66	66	70	73	72	69	64	55	48	744	62
1952	48	51	52	56	63	68	73	76	70	65	55	51	727	61
1953	51	53	58	63	67	70	79	74	70	62	57	49	753	63
1954	49	54	55	63	69	70	76	76	73	63	56	49	753	63
1955	48	49	55	61	65	69	73	75	71	62	55	51	734	61
1956	52	49	58	66	68	68	71	70	70	65	56	54	747	62
1957	54	58	63	68	63	68	74	71	66	61	52	49	747	62
1958	48	52	51	54	63	69	71	74	68	66	54	51	721	60
1959	50	51	57	67	69	72	77	74	69	64	55	51	756	63
1960	48	52	58	63	67	70	72	76	77	68	58	52	761	63
1961	53	59	64	71	77	81	81	79	71	68	58	52	814	68
1962	53	52	57	65	71	78	80	78	76	70	63	54	797	66
1963	51	60	63	69	76	75	79	79	75	71	59	50	807	67
1964	54	56	61	66	70	76	81	79	75	74	57	55	804	67
1965	56	57	62	63	68	76	81	82	74	69	58	48	794	66
1966	49	52	60	64	75	77.	81	81	76	68	59	50	792	66
Total	947	1,005	1,095	1,204	1,291	1,369	1,442	1,427	1,355	1,308	1,120	1,007	14,570	
Mean	50	53	58	63.	68	72	76	75	71	65	56	50	757	63

*Incomplete record.

Table H
Temperature of water
Colorado River below Hoover Dam, Arizona-Nevada
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1941										64	63	60	187	
1942	57	56	55	55	56	58		59	60	61	62	61	640	
1943	57	55	55	56	56	56	57	58	59	60	63	60	692	58
1944	57	55	54	54	54	57	60	61	62	63*	64*	55*	696	58
1945	56*	55*	55*	56*	56*	57*	57*	63*	65*	63*	56*	57*	696	58*
1946	56*	55*	54*	54*	55*	55*	55*	55*	56*	56*	56*	57*	664	55*
1947	56*	55*	55*	54*	54*	55*	55*	55*	67*	68*	66*	59*	699	58*
1948	57*	55*	55*	55*	55*	59*	61*	62*	63*	63*	56*	54*	695	58*
1949	54*	52*	52*	52*	52*	55*	60*	61*	63*	65*	64*	56*	686	57*
1950	52*	52*	52*	52*	53*	54*	61*	60*	55*	56*	56*	56*	659	55*
1951	57*	55*	55*	55*	55*	56*	56*	56*	56*	56*	57*	57*	671	56*
1952	55*	55*	54*	54*	54*	58*	63*	64*	65*	66*	66*	58*	712	59*
1953	55*	55*	55*	55*	56	57*	57*	57*	57*	58*	58*	58*	678	57*
1954	56*	56*	56*	56*	56*	56*	56*	57*	57*	57*	58*	58*	679	57*
1955	57*	55*	53*	53*	53*	54*	56*	55*	56*	58*	58*	58*	666	56*
1956	56*	55*	54*	53*	53*	55*	55*	55*	56*	56*	58*	58*	664	55*
1957	56*	54*	54*	54*	55*	56*	56*	56*	58*	59*	60*	60*	678	57*
1958	58*	56*	56*	55*	56*	56*	56*	56*	56*	56*	57*	57*	675	56*
1959	57*	56*	56*	56*	56*	56*	56*	56*	56*	56*	58*	56*	675	56*
1960	57*	55*	55*	54*	54*	54*	54*	54*	54*	54*	55*	55*	655	55*
1961	55*	55*	54*	54*	54*	55*	55*	55*	55*	55*	55*	55*	657	55*
1962	55*	54*	53*	53*	53*	53*	54*	54*	54*	54*	54*	54	645	54*
1963	54*	54*	54*	54*	54*	56*	57*	57*	57*	56*	56*	56*	665	55*
1964	55*	54*	53*	55*	53*	54*	56*	56*	56*	56*	56*	56*	660	55*
1965	54*	54*	53*	53*	55*	54*	59*	56*	57*	56*	56*	56*	663	55*
1966	56*	56*	54*	54*	54*	54*	55*	55*	55*	54*	55*	55*	657	55*
Total	1,395	1,369	1,356	1,356	1,362	1,390	1,367	1,433	1,455	1,526	1,523	1,482	17,014	
Average	54*	53*	52*	52*	52*	54*	53*	55*	56*	59*	58*	57*	655	55*

*Incomplete record.

Table I
Temperature of water
Colorado River below Parker Dam, Arizona-California
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1954		56*	57	64	71	74	77	78	77	72	64	56	746	
1955	49	48	55	60	67	74	77*	82	78	72	64	57	783	65*
1956	54	52	56	64	69	75	77	79	78	74	62	53	793	66
1957	52	53	60	64	68	74	78	80	78	73	63	54	797	66
1958	52	57	59	64	71	73	77	79	78	74	64	57	805	67
1959	53	54	58	65	71	74	79	79	76	71	64	56	800	67
1960	51	52	57	65	66	68	68	75	74	70	64	53	763	64
1961	50	54	58	65	71	74	76	79	76	71	61	53	788	66
1962	50*	53	56	65	68	72	75	76	76	73	65	59	788	66*
1963	51*	52	58	63	67	72	75	79	80	74	66	56	793	66*
1964	50*	50	54	61	68	72	77	78	76	73	65	55	779	65*
1965	54	55	57	64	69	72	76	78	74	72	65	55	791	66
1966	51	52	56	65	70	74	76	77	74	72	63	55	785	65
Total	617	688	741	829	896	948	988	1,019	995	941	830	719	10,211	
Mean	51*	53*	57	64	69	73	76*	78	76	72	63	55	787	66*

*Incomplete record.

Table J
Temperature of water
Colorado River at Imperial Dam, Arizona-California
(Unit: °F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean
1956	57*	54	61	67	74	81	84	84	82	72	57	51	824	69
1957	53	59	64	67	72	81	86	85	81	71	61	54	834	70
1958	52	57	60	67	77	80	84	86	82	74	61	55	835	70
1959	52	54	60	69	74	82	85	86	80	72	62	54	830	69
1960	54	54	62	68	74	80	83	84	81	72	61	53	826	69
1961	52	56	60	68	74	81	84	86	79	70	58	53	821	68
1962	51	58	58	70	74	80	84	84	83	73*	64	57	836	70
1963	51	58	62	67	75	79	84	85	83	76	62	54	836	70
1964	48	51	58	66	72	80	84	86	80	75	63*	55	818	68
1965	54	55	60	68	74	77	85	86	80	71	64*	54*	828	69
1966	50	51	59	68	75*	78	84	85	80	71*	63*	55*	819	68
Total	574	607	664	745	815	879	927	937	891	797	676	595	9,107	0
Mean	52	55	60	68	74	80	84	85	81	72	61	54		69

*Incomplete record.

PART VII. ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

In order to estimate the probable effect of the authorized or contemplated developments on the quality of water at certain points along the Colorado River, the developments have been separated into five increments. By means of operation studies the estimated effects of each increment can be shown at the pertinent stations. These results are tabulated in Table No. 19 for the new period of record used in this report. An additional station, "Colorado River above Parker Dam," was included in the table only for purposes of clarification and maintaining continuity in computations.

The increments are: (1) storage units of the Colorado River Storage Project; (2) participating projects of the Colorado River Storage Project and other miscellaneous developments; (3) San Juan-Chama Project, Navajo Indian Irrigation Project, and Fryingpan-Arkansas Project; (4) Lower Basin projects, and (5) current proposals.

Following is a discussion of the various projects comprising each increment including a brief description of the physical conditions for each development authorized or contemplated for authorization within each increment and the anticipated effect of each increment on the quality of water at appropriate key stations. It should be recognized that the acreages and depletions as listed could change with change of plans on some of the contemplated projects. The figures presented are those which were current at the time of writing this report.

The effects of all upstream developments are carried on down to and including Imperial Dam.

A. Description of Projects

1. Increment No. 1--Storage Units of the Colorado River Storage Project

Glen Canyon Unit.--The Glen Canyon Dam is located on the Colorado River in Arizona 4 miles south of the Utah-Arizona boundary and 15 miles upstream from Lees Ferry. The bulk of the reservoir lies in Utah. At a normal water surface elevation of 3,700 feet m.s.l., Lake Powell would extend 186 river miles up the Colorado River and 71 miles up from the mouth of the San Juan River. River mile 71 on the San Juan River is 133 river miles from Glen Canyon Dam. This 27,000,000-acre-foot reservoir will regulate the flow of the river for compact delivery purposes and for power generation and thus permit exchanges for upstream consumptive use of the water. Fish and wildlife conservation and recreation will also be of major significance. Average annual reservoir losses are estimated to be 533,000 acre-feet per year. Storage commenced March 31, 1963, in Lake Powell.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Flaming Gorge Unit.--This storage unit is located on the Green River in northeastern Utah and southwestern Wyoming. The primary purposes of the Flaming Gorge Unit are the regulation and storage of flood flows of the Green River and the generation of hydroelectric power. The reservoir has a storage capacity of 3,789,000 acre-feet and average annual reservoir losses of about 54,000 acre-feet. The stored water assists in complying with the terms of the Colorado River Compact and will by exchange furnish an irrigation supply for the participating projects in the Upper Basin States. In addition there will be benefits from fish and wildlife conservation and recreational facilities. Storage commenced November 1, 1962, at Flaming Gorge Reservoir, and from the records taken immediately below the dam it appears that the outflowing water will be nearly uniform in quality.

Navajo Unit.--The Navajo Dam and Reservoir are located on the San Juan River in northwestern New Mexico and southwestern Colorado. Total storage capacity of the reservoir is 1,709,000 acre-feet, and the reservoir evaporation losses are estimated to average 30,000 acre-feet annually. This reservoir regulates the flow of the river for irrigation of the Hammond project, the Navajo Indian Irrigation Project, and for other uses including by exchange potential uses above the reservoir and transmountain diversions to the San Juan-Chama Project. It also helps regulate the flows of the Colorado River at Lees Ferry. Other purposes include recreation, sediment control, fish and wildlife propagation, and flood control. Storage began July 1, 1962, and the effect on quality is recorded at the Archuleta station below Navajo Dam.

Curecanti Unit.--Facilities of the Curecanti Unit, located in west-central Colorado, include the Blue Mesa, Morrow Point, and Crystal Dams, Reservoirs, and Powerplants. The primary purposes are regulation and storage of flood flows of the Gunnison River and generation of hydroelectric power. In addition benefits will be provided to recreation, fish and wildlife conservation, and irrigation. The reservoirs of the Curecanti Unit will help regulate the flows of the Colorado River at Lees Ferry. The storage capacity provided is 941,000 acre-feet at Blue Mesa, 117,000 acre-feet at Morrow Point, and 27,000 acre-feet at Crystal Reservoir with total reservoir evaporation losses estimated to average 15,000 acre-feet annually for all three units. Storage was initiated late in 1965 at the Blue Mesa Reservoir and on January 24, 1968, at the Morrow Point Reservoir. Construction has not yet been initiated on Crystal Dam.

It is expected that operation of the Curecanti Unit on the Gunnison River will improve the quality of the Colorado River below Grand Junction during the late summer months.

2. Increment No. 2--Participating Projects and Other Miscellaneous Projects

Seedskadee Project.--This multipurpose project is located adjacent to and will divert water from the Green River in southwestern Wyoming to irrigate about 58,775 acres of land. Municipal and industrial water, recreation, and fish and wildlife protection are other purposes of the project. A depletion of 165,000 acre-feet is anticipated when the project is fully developed. Fontenelle Dam and Powerplant are now complete, but irrigation of the project lands is awaiting results from the development farm now undergoing tests in the project area. The irrigation of 15,000 acres is in question until a determination has been made of the effect the mining of trona will have on land subsidence and irrigation development. The Seedskadee area has not been previously irrigated except for the land in the experimental development farm so it affords an opportunity to determine the effect irrigation has on water quality under the given soil and crop conditions.

Lyman Project.--This is a multipurpose project located in southwestern Wyoming. Project facilities consist of two dams and reservoirs. One will be located at the Meeks Cabin site on the Blacks Fork in Wyoming and will provide 33,000 acre-feet of storage capacity. The other will be located at the China Meadows site of the East Fork of Smith Fork in Utah and will provide 13,000 acre-feet of storage capacity. The project will have the primary purpose of providing supplemental water to 42,674 acres of existing farmland along with fish and wildlife and recreation benefits. Construction of Meeks Cabin Dam is now under way. This project will give an opportunity to study the effect on quality of adding supplemental water to lands already irrigated. The resulting new depletion will be 10,000 acre-feet.

Emery County Project.--The Emery County project is located in east-central Utah and is multipurpose in scope. It will furnish a supplemental irrigation water supply to 18,000 acres and a full supply to 770 acres of new land with a resulting new depletion of 17,000 acre-feet. The project will also benefit fish and wildlife and recreation. Storage at Joes Valley and Huntington North Reservoirs was started in 1965. It has been anticipated that the addition of supplemental water would improve the quality of water below the project in some months, but a period of actual operation will be required to determine the extent, if any, of such improvement.

Silt Project.--This project now completed is located along the Colorado River in western Colorado and obtains water from Rifle Creek and by pumping from the Colorado River. Rifle Gap Reservoir will store 13,602 acre-feet. A full supply will be furnished to 2,400 acres of new land and a supplemental supply to 4,160 acres.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The water of Rifle Creek is shown by laboratory analysis to be of good quality for irrigation. Return flows from irrigated lands are also suitable for reuse on lower lands. The Cameo station shows the Colorado River water to be of high quality throughout the year. The new annual stream depletion is 6,000 acre-feet.

Fruitland Mesa Project, Colorado.--This project is located in western Colorado in Gunnison River Basin. A 48,235-acre-foot storage reservoir on Soap Creek and diversion from Crystal and Curecanti Creeks would provide water needed for 15,870 acres of newly irrigated land and 7,000 acres of land now irrigated. Project uses will increase Colorado River depletions by 28,000 acre-feet per year.

The project water for irrigation use has been determined by laboratory analysis to be of excellent quality. Likewise, most of the return flow considered as part of the project water supply will be diluted with higher quality direct flow.

Bostwick Park Project, Colorado.--This small project is located in Montrose and Gunnison Counties in west-central Colorado. Storage regulation will be provided by a 13,520-acre-foot reservoir on Cimarron Creek, a tributary of the Gunnison River. Only 1,610 acres of new land will be irrigated, and the increased depletion to the Colorado River will be 4,000 acre-feet. Some additional water will be provided to land now irrigated. The water of Cimarron Creek has been determined by laboratory analysis to be of good quality for irrigation. The Bostwick Park Project is now under construction and is scheduled for completion in the latter part of 1970.

Savery-Pot Hook Project, Colorado-Wyoming.--This project is located in the Little Snake River Basin in southern Wyoming and northwestern Colorado. The authorized project plan calls for construction of an 18,600-acre-foot capacity reservoir on Savery Creek and a 65,000 acre-foot capacity reservoir on Slater Creek. This storage will make possible the irrigation of 21,920 acres of new land and will provide supplemental water for land presently irrigated. Plan modifications are being considered in the definite plan studies now underway. Depletion of the Little Snake River by the Savery-Pot Hook Project would amount to 38,000 acre-feet annually.

Central Utah Project (Bonneville Unit).--The Bonneville Unit will include a transmountain diversion of water from the headwaters of the Duchesne River in the Uinta Basin portion of the Colorado River Basin to the Bonneville Basin. Related developments of local water sources will be made in both basins. The project will develop water for irrigation, municipal and industrial use, and power production. It will also provide benefits to recreation, fish and wildlife, flood control, water quality control, and area redevelopment.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The net depletion to the Green River will be 166,000 acre-feet of which 136,000 is depleted in the Bonneville Basin and the balance in the Uinta Basin.

Central Utah Project (Upalco and Jensen Units).--The Upalco Unit will be located in Duchesne County near Roosevelt, Utah. The plan of development is primarily to provide supplemental irrigation water for Indian and non-Indian lands along Lake Fork River and to enhance recreation, fish, and wildlife while maintaining flood control. The mean annual stream depletion is estimated to be about 10,000 acre-feet.

The Jensen Unit will be located along the Green River east of Vernal in Uintah County in Uinta Basin, Utah. Storage of water in Tyzack Reservoir on Brush Creek together with pumping from the Green River will supply 440 acres of new land and 3,640 acres of presently irrigated lands. Approximately 18,000 acre-feet of water is anticipated to be used for municipal and industrial purposes.

Denver, Englewood, Colorado Springs, and Pueblo, Colorado.--Expansion of municipal supplies for these four cities will eventually deplete the Colorado River by 234,000 acre-feet above present uses. These are transmountain diversions from the Blue, Fraser, and Eagle Rivers in the headwaters of the Colorado River. The diversions would vary according to runoff each year.

M&I Green Mountain.--Water stored in Green Mountain Reservoir will be released for industrial use in the vicinity of Kremmling, Colorado, and in Garfield County, Colorado. This depletion will ultimately be about 12,000 acre-feet.

Expansion Hogback.--This direct diversion to Indian lands adjacent to the San Juan River will result in a new depletion of about 10,000 acre-feet annually.. These lands, in the vicinity of Shiprock, New Mexico, have been developed in small blocks by the Bureau of Indian Affairs over a period of years with further expansion planned for the future. The seepage and return flows return direct to the San Juan River, but the quality of these flows has not been determined.

Homestake Project, Colorado.--The Homestake Project in Colorado, under construction by the cities of Aurora and Colorado Springs, will divert an average of 74,000 acre-feet annually to the eastern slope from the headwaters of the Colorado River. These diversions will vary from a low of 50,200 acre-feet to a high of 108,400 acre-feet in a period similar to the 1941 to 1966 period.

Private Industrial Developments.--A number of private industrial developments either under construction or contemplated will result in certain depletions and will have some effect on water quality.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

(1) Industrial developments in southwestern Wyoming, including Westvaco and the Utah Power & Light Company's steam electric powerplant at Kemmerer, will consumptively use another 36,000 acre-feet when fully developed.

(2) The Hayden Steamplant in Colorado now using 4,000 acre-feet will eventually require 16,000 acre-feet.

(3) In northwestern New Mexico a large steam electric powerplant which has been partially completed by Utah Construction Company for the Navajo Indian Tribe and the Arizona Power Authority is now using 15,000 acre-feet out of an estimated 40,000 acre-feet when the plant is complete.

Independence Pass Expansion.--This development consists of enlarging and lining an existing collection system on the western slope in Colorado with provisions for winter operation. The water will be collected from the headwaters of Roaring Fork for transmountain diversion to the Arkansas River Basin. The new depletion to the Colorado River will be about 14,000 acre-feet annually with possible storage in enlarged Twin Lakes Reservoir.

3. Increment No. 3

San Juan-Chama Project.--Construction is underway on this transmountain diversion project with delivery of water to the Rio Grande Basin expected to be initiated in 1971. The project will divert an average of 110,000 acre-feet annually from the headwaters of the San Juan River across the Continental Divide to the Rio Grande Basin. The effect of this depletion on the Colorado River will be that some dissolved solids will be transported out of the basin and less high quality water will be available downstream for dilution of lower quality water.

The water will be used in New Mexico for municipal and industrial developments and for irrigation.

Navajo Indian Irrigation Project.--Construction activities are underway on this project, but completion of construction and delivery of water are several years away. The direct diversion of 508,000 acre-feet of water annually from the Navajo Reservoir to 110,000 acres of lands south of the San Juan River is contemplated. None of these lands is presently irrigated and the effect of irrigation on the quality and quantity of return flow is difficult to predict.

There will be times under ultimate basin development when the San Juan Valley lands below Farmington, New Mexico, will be dependent largely upon return flows for their supply of irrigation water. There is very little data upon which to base estimates of the quality of the return flow. Miscellaneous records from the San Juan, Animas, and La Plata Rivers indicate some periods of low flow produce water of questionable quality, especially from the La Plata River system where some of the lands are known to be of marine origin. Practically all of the lands in the Navajo Indian Irrigation Project which would contribute return flow at the Hogback, however, are of fresh water origin with low salinity and alkalinity as determined by soil borings. To ascertain the quality of return flow with any degree of certainty, additional field data will be necessary prior to completion of definite plan investigations. The estimated depletion is 250,000 acre-feet annually.

Fryingpan-Arkansas Project.--Construction is underway on this project, and initial storage was scheduled for spring of 1968. This transmountain diversion project will transfer water from the headwaters of the Colorado to the Arkansas River. It is a multipurpose development to supply supplemental irrigation water, municipal water, and water for power production. In addition the project will also control floods originating above Pueblo, retain sediment, preserve fish and wildlife, and provide recreation opportunities. The average annual depletion will be 70,000 acre-feet, including 1,000 acre-feet of evaporation from the Ruedi Reservoir on the west slope.

4. Increment No. 4--Lower Basin Projects

Dixie Project, Utah.--The recently authorized Dixie Project will, through construction of multipurpose dams on the Virgin and Santa Clara Rivers, provide a full water supply to 6,900 acres of new land and a supplemental water supply to 10,000 acres of existing irrigated land. About 5,000 acre-feet of municipal and industrial water will be provided to the city of St. George. Cedar City, Utah, can also exercise an existing agreement to divert up to 8,000 acre-feet of water out of the basin from upper tributaries.

A principal concern of the downstream users in Arizona and Nevada will be in regard to the effect of project operations on water quality and the amount of flood waters available for leaching purposes. In this regard the effect of the highly mineralized LaVerkin Springs, which enter the river above the proposed Virgin River Dam, is of considerable importance.

The estimated increased depletion of the Virgin River due to total project development will be 48,000 acre-feet per year. Disposal of the waters of the LaVerkin Springs would increase the estimated annual depletion by the quantity of water removed from the river system. The average annual flow of the Virgin River at Littlefield under present conditions based on January 1941 through December 1966 records is 154,000 acre-feet.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Southern Nevada Water Project, Nevada.--The recently authorized Southern Nevada Water Project, now under construction, will provide supplemental municipal and industrial water to the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City and to Nellis Air Force Base. It will also provide water to the potential Eldorado Valley development.

In the ultimate stage of development of the project, the estimated total annual diversions from Lake Mead by the existing Boulder City and Basic Management, Incorporated, water systems will be 52,000 acre-feet. The estimated total annual diversions by the project will be 328,000 acre-feet, giving a total ultimate annual diversion from Lake Mead to the project area of 380,000 acre-feet.

The estimated net annual depletion due to the project and existing systems will total 262,000 acre-feet, allowing for creditable return flows of 118,000 acre-feet. The annual depletion by the existing systems in 1966 was 9,000 acre-feet. Thus, the additional annual depletion due to the project and existing systems will be 253,000 acre-feet.

A portion of the Southern Nevada Water Project allotment of 262,000 acre-feet will be used by the Southern California Edison Company by diverting 30,000 acre-feet annually from the Colorado River for thermal power production purposes at a site about 3 miles downstream from Davis Dam. Use of this water until July 1, 2006, by the Southern California Edison Company is in accordance with two contracts--one with the State of Nevada and the Southern California Edison Company and one with the Bureau of Reclamation and the State of Nevada. This depletion is included in the depletion anticipated for the Southern Nevada Water Project and would not cause an additional depletion.

Fort Mohave Indian Reservation.--The Fort Mohave Indian Reservation, located below Davis Dam, is allocated water by the Supreme Court Decree to irrigate 18,974 acres of land in Arizona, California, and Nevada with a maximum annual diversion from the Colorado River of 122,648 acre-feet. The consumptive use required for irrigation of these lands is estimated to be 4 acre-feet per acre, which would result in main-stream depletion of about 76,000 acre-feet annually. The Bureau of Indian Affairs reports that a major portion of this reservation is under development contract.

Chemehuevi Indian Reservation.--The Chemehuevi Indian Reservation, located above Parker Dam, is allocated water by the Supreme Court Decree to irrigate 1,900 acres of land in California with a maximum annual diversion from the main stream of the Colorado River of 11,340 acre-feet. The consumptive use required for irrigation of these lands is estimated to be 4 acre-feet per acre, which would result in a main-stream depletion of about 7,000 acre-feet annually. Full development of this reservation is expected by 1990.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Lower Colorado River Indian Reservation.--The Lower Colorado Indian Reservation is located along the Colorado River just below Parker Dam, Arizona, with most of the land in Arizona and the remainder in California. The Supreme Court Decree allocated 717,148 acre-feet of diversions to the Colorado River Indian Reservation for irrigation of 107,588 acres of land. The consumptive use required for irrigation of these lands is estimated to be 4 acre-feet per acre, which would result in an annual main stream depletion of 430,352 acre-feet. The consumptive use in 1966 from irrigation of 36,919 acres was 201,966 acre-feet. This leaves an additional depletion of about 229,000 acre-feet per year for future developments.

Central Arizona Project.--The Colorado River Basin Project Act authorizes the Central Arizona Project for the purposes of furnishing irrigation and municipal water supplies to the water deficient areas of Arizona and western New Mexico through direct diversion or exchange of water. This project will provide a supplemental water supply to lands now being irrigated. Water will be made available only to lands having a recent irrigation history. The Central Arizona Project must stand any shortages that would occur if the Colorado River Compact requirement of 7.5 million acre-feet per year cannot be made available for use from the main stream in the United States below Lee Ferry. When shortages occur, diversions to the Central Arizona Project will be limited to assure California water users 4.4 million acre-feet of main stream water. Assuming the first four increments in operation and Increment 5 not in operation, the Central Arizona Project would receive 1,321,000 acre-feet under the average present modified flow conditions for the period 1941-66. With all five increments in operation the Central Arizona Project supply would be reduced by 676,000 acre-feet.

Lower Colorado River Channelization Project, Arizona-California.--The Lower Colorado River channelization program will effect the salvage of substantial quantities of water along the Lower Colorado River for beneficial use. This project was authorized under the Colorado River Front Work and Levee System. The basic plan involves complete channelization and bank stabilization of the Lower Colorado River from Davis Dam to the southerly International Boundary. Channelization by dredging is specified in most cases where the river is aggrading. Bank stabilization is recommended for the river reaches when degradation is in progress except where channel alignment requires improvement.

Water salvage will be accomplished by reducing waste and uneconomic uses of water from side channels, ponds, and swamps and by improved drainage, together with a reduction in direct channel losses by improved conveyance characteristics.

The project is divided into nine separate divisions. However, only those reaches upstream from Imperial Dam are considered in this analysis.

The channelization work for the Mohave Valley Division was completed in 1960 and its effect on the flow at downstream measuring gages is reflected in present modified flows. Part of the salvage previously estimated for the Topock Gorge Division has been accomplished by the channelization work in the lower part of the Mohave Valley Division. The remaining salvage upstream from Parker Dam anticipated for the Topock Gorge Division would be 28,000 acre-feet annually. It is estimated that channelization in the Parker, Palo Verde, Cibola, and Imperial Divisions between Parker and Imperial Dams would salvage 85,000 acre-feet annually. Total additional annual salvage upstream from Imperial Dam would thus be 113,000 acre-feet.

Additional water salvage would occur through phreatophyte eradication and control. Of the 100,000 acre-feet possible in the Lower Colorado River Basin, 88,000 acre-feet would be above Imperial Dam. Approximately 59,000 acre-feet would be above Parker Dam, and 29,000 acre-feet would be between Parker and Imperial Dams. The combined annual salvage above Parker Dam from the channelization and phreatophyte eradication and control programs would be 87,000 acre-feet. Between Parker and Imperial Dams the salvage from the combined programs would be 114,000 acre-feet. The total salvage above Imperial Dam is 201,000 acre-feet.

5. Increment No. 5--Current Proposals

The current proposals include a number of irrigation and M&I projects that are either not authorized, very recently authorized, or the time of development is not certain. These projects are all above Lees Ferry and would permit the Upper Basin to more nearly utilize its share of Colorado River water. The plans of development and the depletions are subject to change for most of these proposals.

Four County, Colorado.--This non-Federal development, as proposed, would divert 40,000 acre-feet of water through the Continental Divide for use in Colorado. The water would be transported from the headwaters of the Yampa River through Rabbit Ears Pass to the North Platte Basin, from which basin an equivalent amount of water would be directed by exchange over Willow Creek Pass into the Colorado River drainage, thence by transbasin diversion to Lafayette, Erie, Broomfield, Brighton, Thornton, and Ft. Lupton.

Uintah Unit, Utah.--The Uintah Unit of Central Utah Project will provide supplemental water and also a supply for 7,800 acres of new lands on the south slope of the Uinta Mountains in the Uinta and Whiterocks River drainage areas. The new annual depletion will be about 31,000 acre-feet, affecting the Duchesne, Green, and Colorado Rivers.

Dolores Project, Colorado.--The Dolores Project will divert water from the Dolores River Basin to the San Juan drainage for the irrigation of 61,000 acres. Some 32,000 acres will be new land, the remaining 29,000 acres of land are now receiving a partial supply. This project will deplete the flow of the Colorado River at Lee Ferry by about 87,000 acre-feet.

Return flows from lands in the Montezuma Valley are presently used for irrigation of land in McElmo Canyon outside the project area. Analyses show these flows have relatively high concentrations of soluble salts. They are successfully used for irrigation, however, because of internal drainage characteristics of the soils. The salt concentration of these flows is not expected to increase with project development.

San Miguel Project, Colorado.--The San Miguel Project will regulate flows of the San Miguel River for irrigation, municipal and industrial use, recreation, flood control, and fish and wildlife conservation. The project will supply water to 26,000 acres of new land and 12,500 acres of land now receiving a partial supply. Depletion of the Colorado River will be about 85,000 acre-feet.

Dallas Creek Project, Colorado.--The Dallas Creek Project will develop water of the Uncompahgre River and tributaries for irrigation and municipal and industrial use. The project will provide water for 15,000 acres of new land and supplemental water for 13,700 acres of land presently irrigated. Depletion of the Colorado River will amount to 37,000 acre-feet annually.

The project water supplies will be suitable in quality for irrigation and for municipal and industrial uses as well.

M&I--Ruedi Reservoir, Colorado.--Storage rights in Ruedi Reservoir would permit the use of 40,000 acre-feet for oil shale development along the Colorado River in Colorado. The water would be supplied to Ruedi Reservoir from the Fryingpan River and then released through natural channels to the points of use in the oil shale areas. A possible future alternative use for all or part of this water would be for irrigation purposes.

Animas-La Plata Project, Colorado-New Mexico.--The Animas-La Plata Project will develop flows of the Animas and La Plata River systems for irrigation, municipal and industrial use, recreation, and fish and wildlife conservation. The project will supply water to 46,500 acres of new land and 25,600 acres of presently irrigated land. The new land will include 17,200 acres of Indian land. The total new depletion will amount to nearly 146,000 acre-feet. Project features include four storage dams, lengthy canals, and several diversion dams.

Preliminary water quality studies indicate that irrigation will not present any particular quality problem, and the additional return flow at the state line may be somewhat improved over the present.

Cheyenne, Wyoming.--The city of Cheyenne diverts water from the Little Snake River to a tributary of the North Platte in exchange for water diverted from Douglas Creek for municipal use by the city of Cheyenne. This transmountain diversion is now using about 9,000 acre-feet and will ultimately deplete the Colorado River by an additional 22,000 acre-feet.

Resources, Incorporated, Utah.--Resources, Incorporated, proposes to construct a large powerplant in Utah near Lake Powell using coal from the Kaiparowits Plateau for fuel and water from Lake Powell for plant operation. The expected annual depletion to the Colorado River would be 102,000 acre-feet, based on the company's application to the State of Utah for that much water. The exact date of this depletion is not known at present.

M&I in Arizona.--The Upper Colorado River Compact allocated 50,000 acre-feet to Arizona from the Upper Colorado River system and of that amount about 11,000 acre-feet is presently being used.

The remaining 39,000 acre-feet will be used in that portion of Arizona within the Upper Basin and would be diverted above Lees Ferry. The specific areas and uses are not known at present.

West Divide Project, Colorado.--The West Divide Project will provide 115,600 acre-feet of water for irrigation and 77,500 acre-feet for municipal and industrial use. The irrigation water will supply nearly 19,000 acres of new land and a supplemental supply to 21,000 acres of land presently irrigated. The new depletion of Colorado River water will be 76,000 acre-feet annually. Project water will be obtained from a series of Colorado River tributaries south of the river in west-central Colorado with most of the storage planned for the 105,000-acre-foot Placita Reservoir.

B. Incremental Effects

1. Increment No. 1

The anticipated effect of the four storage units (Curecanti, Flaming Gorge, Glen Canyon, and Navajo) is shown in Table 19.

In the January 1967 report, future anticipated reservoir operations were included as part of the effects at downstream stations. In this present report it was assumed there would be no net future reservoir changes over the 26-year period to affect downstream stations. Future evaporation was the only reservoir effect considered.

The effects of the storage units have been partly accounted for in the historical and present modified tabulations because storage began in 1962, 1963, and 1965. The initial impoundment of storage in the reservoirs of the Colorado River Storage Project is partially offset by greater drafts on Lake Mead storage than would otherwise have been made.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The remaining incremental effects of the storage units were determined by adding the total impoundment at the end of 1966, averaged over the 26 years, to the present 1966 annual evaporation losses from these reservoirs and reducing this by the estimated future average annual reservoir evaporation.

The result is an average annual gain of 239,000 acre-feet as the net effect over estimates of present modified flows of the future operations of the Colorado River Storage Project units. Similar computations, including effects of upstream reservoirs, were made for the Lower Basin reservoirs--Lake Mead, Lake Mohave, and Lake Havasu.

2. Increment No. 2

The effects under Increment No. 2 include: depletions from miscellaneous projects, a minor amount of evaporation from participating project reservoirs, transmountain diversions, participating project depletions, and the effect of irrigation under salt balance conditions and with an assumed pickup of 2 tons per acre on the new irrigated lands. Although the range of pickup from zero to 2 tons has been assumed for these studies, the assumption appears to be substantiated by developments on the Eden, Florida, and other projects. Further, more detailed studies will be made to develop better estimates of the yield of salts from irrigation projects.

The effect of Seedskadee irrigation project on water passing the Green River, Wyoming, gage would be an increase in concentration from 0.43 to 0.49 ton per acre-foot if no dissolved solids are leached from the land; and if 2 tons per acre are picked up, the concentration would increase to 0.60 ton per acre-foot.

Moving on down the Green River to the Greendale gage, with the Flaming Gorge Reservoir in operation, the Seedskadee and Lyman irrigation projects and industrial developments, including the Utah Power & Light Company steamplant, would increase the concentration by 0.09 ton per acre-foot to 0.66 ton per acre-foot if no dissolved solids are picked up and to 0.74 ton per acre-foot if 2 tons per acre are picked up.

The Duchesne River near Randlett would be affected mostly by the transmountain diversions to the Central Utah Project, and with zero pickup the concentration would increase from 0.97 to 1.58 tons per acre-foot.

The Green River near Ouray, Utah, and the Green River at Green River, Utah, stations are both affected by the same upstream developments. The concentration would increase by 0.07 and 0.06, respectively, with no pickup and 0.11 and 0.12, respectively. with 2 tons per acre of pickup.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The San Rafael River near Green River, Utah, is affected by the Emery County Project, with concentrations in tons per acre-foot increasing from 2.21 for present modified conditions to 2.69 with no pickup and 2.71 with 2-ton per acre pickup.

The flow past the Glenwood Springs gage on the Colorado River is affected by transmountain diversions to Denver, Englewood, Colorado Springs, Pueblo, and Aurora, Colorado, and by the M&I Green Mountain demands. These depletions would increase the dissolved-solids concentration at Glenwood Springs by 0.09 ton per acre-foot under either condition of pickup.

The same depletions as those for the Glenwood Springs station with the addition of Silt Project would affect the Cameo gage flow. These depletions would increase the dissolved-solids concentration at Cameo by 0.07 ton per acre-foot under either condition of pickup.

On the Gunnison River near Grand Junction with the Curecanti Unit in operation the concentration would be affected by the Fruitland Mesa and Bostwick Park Projects, resulting in a 0.02-ton per acre-foot increase with no pickup and a 0.04 increase with 2-ton per acre pickup.

The Colorado River near Cisco gage is affected by the east slope diversions and by the M&I Green Mountain, Silt, Fruitland Mesa, and Bostwick Park Projects. These transmountain diversions and inbasin projects increase the concentrations from 0.88 to 0.94 ton per acre-foot with no pickup and to 0.95 with 2-ton per acre pickup.

The San Juan River near Bluff gage is affected by the Expansion Hogback and Utah Construction Company depletions. These depletions result in a 0.02-ton per acre-foot increase.

The total depletions of Increment No. 2 increase the concentration at Lees Ferry from 0.80 to 0.86 ton per acre-foot with no pickup, and with 2 tons of pickup the concentration increases from 0.80 to 0.88 ton per acre-foot.

The sizable depletions of this increment have somewhat the same effect at Grand Canyon and Hoover as they do at Lees Ferry, but the decrease in the available water at Parker and Imperial Dams results in increases in concentrations at Imperial of 0.11 ton per acre-foot with no pickup and 0.14 with a 2-ton per acre pickup, or a total of 1.27 tons per acre-foot.

3. Increment No. 3

Increment No. 3 is composed of the San Juan-Chama transmountain diversions, the Navajo Indian Irrigation Project, which constitutes the largest new irrigation project within the Upper Colorado River Basin, and the Fryingpan-Arkansas Project.

The Fryingpan-Arkansas Project is a transmountain diversion project increasing the concentration of the river at the Cameo gage by 0.02 ton per acre-foot.

At Bluff the San Juan River is affected by the return flows from the Navajo Indian Irrigation Project, showing an increase in concentration from 0.64 to 0.81 ton per acre-foot with no pickup and to 1.00 ton with 2 tons of pickup.

The effect of Increment No. 3 at the Lees Ferry gage is to increase the concentration by 0.06 ton per acre-foot both with no pickup and with the assumed pickup of 2 tons per acre.

4. Increment No. 4

This increment includes depletions for the Dixie, Southern Nevada Water, and Central Arizona Projects; development of Indian lands on the Fort Mohave, Chemehuevi, and Colorado River Indian Reservations; a decrease in diversions through the Colorado River Aqueduct by the Metropolitan Water District; and increases to the water supply resulting from salvage by channelization and phreatophyte control of the Lower Colorado River.

The Dixie Project will affect the Virgin River at Littlefield. The Dixie and Southern Nevada Water Projects will affect the river from Hoover Dam and downstream. The flows entering Lake Havasu will be changed by the Dixie and Southern Nevada Water Projects by development of the Fort Mohave and Chemehuevi Indian Reservations and by the annual salvage of 87,000 acre-feet which will result from salvage of 28,000 acre-feet by the river channelization program and 59,000 acre-feet by the phreatophyte eradication and control program. Flows below Parker Dam will be affected by the above-listed projects and diversions for the Central Arizona Project. With the Central Arizona Project, diversions to the Metropolitan Water District will be limited to 550,000 acre-feet. Flows arriving at Imperial Dam will reflect the changes at Parker Dam, additional development of the Colorado River Indian Reservation, and additional salvage. In this section of the river an annual salvage of 114,000 acre-feet would be accomplished by salvaging 85,000 acre-feet by the river channelization control program and by salvaging 29,000 acre-feet by the phreatophyte eradication and control program.

The Dixie and Southern Nevada Water Projects will cause an estimated increase in the concentrations at Hoover Dam by 0.04 ton per acre-foot with zero pickup and 0.04 ton per acre-foot with 2 tons per acre of pickup.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The Dixie and Southern Nevada Water Projects, the Fort Mohave and Chemehuevi Indian Reservations, and the water salvage programs would cause an increase in the concentrations of inflow to Lake Havasu by 0.04 ton per acre-foot with zero pickup and by 0.05 ton per acre-foot with 2 tons per acre of pickup.

The above projects plus the changes in diversions to the Central Arizona Project, assuming the use of water from Increment No. 5, would cause an increase in the concentrations at the station below Parker Dam by 0.04 ton per acre-foot with no pickup and 0.05 ton per acre-foot with 2 tons per acre of pickup.

Additional increases in the concentration of salts at Imperial Dam will be caused by the above projects and from development on the Colorado River Indian Reservation and from additional water salvage.

An increase of 0.10 ton per acre-foot with zero pickup and 0.14 ton per acre-foot with 2 tons per acre pickup is indicated at Imperial Dam. In these calculations it was assumed that the Central Arizona Project would make temporary use of Increment No. 5 water.

5. <u>Increment No. 5</u>

This increment, consisting of nearly 700,000 acre-feet of additional depletions, results in further increases in concentration at various points in the system.

The Uintah Unit, with no pickup of salt, increases the concentration at the Duchesne River near Randlett, Utah, station from 1.58 tons per acre-foot to 1.81 tons per acre-foot and, with pickup from 7,800 acres of new irrigated land, increases the concentration to 1.89 tons per acre-foot.

The combined effect of M&I uses from Ruedi Reservoir, West Divide, Dallas Creek, Dolores, and San Miguel Projects increases the Cisco concentration by 0.08 without pickup and by 0.11 with pickup. The Dolores Project, however, is a transbasin diversion, resulting in a depletion at the Cisco gage, with return flows affecting the Bluff gage, since the project lands are in the San Juan drainage.

The Animas-La Plata and Dolores Projects combined increase the concentration at Bluff from 0.81 to 0.91 without pickup and from 1.00 to 1.25 tons per acre-foot with pickup.

Increment No. 5 increases the concentration at Imperial Dam to 1.51 with no pickup and to 1.65 tons per acre-foot with a pickup of 2 tons per acre. This is the result of use of the water by all listed projects above Imperial Dam.

PART VIII. OBJECTIVES

A. Suitability for Irrigation

Irrigation has been practiced in many areas in the Colorado River Basin for nearly a hundred years; and as long as adequate drainage has been provided, either natural or artificial, there has been little loss of productivity through salinization and alkalinity of the soils. While early irrigation began without particular regard to water quality, this now is an important consideration, and on all projects the quality of the water is studied in relation to the soil on which it is to be used.

No rigid limits of salinity have been set for irrigation waters within the basin and none seem advisable under varying soils and cropping conditions encountered. It will always be necessary to evaluate water quality in light of soil conditions as well as cropping patterns and irrigation practices.

The Colorado River accumulates an increasing mineral content both from natural sources and irrigation uses as it moves downstream from its headwaters. Despite these increases the water is still suitable for irrigation in the lower reaches of the basin. Proper irrigation practices including drainage are stipulated requirements in order for irrigation to be successful. Many crops will not flourish when subjected to a high water table regardless of salt content, so drainage serves a twofold purpose on irrigated lands.

B. Suitability for Industrial Use

The Colorado River water has not been widely used for industrial purposes within the basin but extensive use has been made of this water from transmountain diversions outside the basin, and wherever used it has proved generally satisfactory.

One primary requirement for industries is that the concentration of the various constituents remains relatively constant. Once a particular industrial process is started and the water treatment has been determined, any fluctuation in quality requires continued attention and expense. Snowmelt runoff streams are subject to seasonal changes in quality. Storage reservoirs level out the seasonal changes in quality and, with a greater amount of storage now available in the basin, the possibilities for industrial use are now much greater.

The quality of water required for industrial use varies widely for the many purposes to which water is put, and within any industrial plant water may have several functions.

Cooling is the largest single use of industrial water supplies in the Colorado River Basin, ranging in different areas from 57 percent to 80 percent of the total requirement. Recirculatory cooling systems are the prevalent type owing to the need to economize on water use. Unless specially constructed of corrosion-resistant material, such systems are limited in their tolerance of salinity. Limits of reasonable practice are about 2,000 to 3,000 mg./l. of TDS in the Southwestern States. Salt concentrations are held within these limits by blowdown (discharging part of the coolant to waste) and by makeup with fresh water. Blowdown is a function of the mineral quality of the water supply, and the more saline the supply, the greater the volume of makeup needed. Use of mineralized water also requires treatment or conditioning to inhibit scale formation and corrosion.

Similar considerations apply to use of mineralized water in low-pressure shell boiler systems, the type commonly found in manufacturing plants. Penalty costs are associated with a saline makeup water, owing to the need to use more of it and to treat the incremental amount. In addition, makeup water high in the dissolved mineral ions causing hardness (mainly calcium and magnesium) must be softened. The harder the water, the higher the cost of softening.

The yearly summary of ions at the various quality stations as shown beginning with Table 21 provides data that can be used with industrial water quality criteria to evaluate the water for the particular purposes of certain industries. This information is also available on a monthly basis for the 1941-66 period in supporting data to this report.

C. Suitability for Domestic Use

One purpose of these quality of water studies is to determine the suitability of Colorado River water for domestic purposes in the various areas where it is used or proposed to be used. This would include estimating the effects of additional developments and evaluating the suitability above and below present irrigation and industrial developments.

The quantity of water used at present for domestic purposes within the Upper Basin is small compared to irrigation uses. It is estimated that more domestic water is exported out of the basin than is used within the basin, and this generally is good quality water from the higher elevations.

Most of the authorizing reports prepared for Federal projects evaluate the quality of water for domestic use along with irrigation, and in many instances domestic water is being provided by the project for municipal use. In other cases storage space is allocated for future domestic use. It is also expected that some project water now intended for irrigation use will eventually be used for domestic purposes as the population increases.

Storage usually improves surface water supplies for domestic use by providing water of more uniform quality and by reducing sediment and turbidity. The results are applicable to irrigation, domestic, or industrial uses with respect to dissolved-solids concentration. On the other hand storage sometimes degrades mineral quality slightly, owing to loss of water by reservoir surface evaporation, thereby increasing the concentration of dissolved mineral solids.

Under the conditions expected with the developments now authorized, the storage water will be suitable for domestic use in most cases, and with a few exceptions, such as the San Rafael River below Emery County Project, the return flows diluted with natural runoff will also be satisfactory.

The Metropolitan Water District of Southern California has obtained a portion of its water supply for municipal and industrial use by pumping Colorado River water from Lake Havasu since January 7, 1939. The quantity pumped increased gradually to a total of about 1,146,000 acre-feet in 1966. The quality of the water has always been suitable with appropriate treatment for domestic and industrial use in the southern California area. The raw water does require softening. Hardness is reduced over 60 percent in the Weymouth treatment plant from a natural hardness around 330 p.p.m. to a finished water hardness of about 125 p.p.m. The scale of the operation is so large that small increases in hardness affect water treatment costs appreciably.

Many quality studies have been performed outside the scope of this program. The results of those studies and analyses were available for this study and have been included when pertinent. For the Central Utah Project, chemical analyses of more than 1,200 water samples taken at about 100 collection points have been used to determine quality conditions within the project area for both domestic and irrigation uses.

Domestic uses in the future will become more important and water quality more critical both within and outside the basin area. The present data collection program will likely be continued, some stations may be added, and some monitoring will be required.

PART IX. SALINITY CONTROL

A. Identification of Sources

The sources of salinity can be divided into (1) natural sources and (2) man-caused sources. The natural source of salinity consists of that from springs, wells, high salinity streams, and general precipitation and percolation. These have been mentioned in Part V, "Basic Studies." The man-caused sources consist of irrigated and drained lands, mining and drilling, and municipal and industrial wastes.

B. Control Measures

The control of salinity can be accomplished in two ways: (1) by dilution (water supply increase) and (2) salt load reduction (desalinization).

Under water supply increase, several methods can be considered. These are as follows: (a) import of high quality water; (b) weather modification; (c) conservation of water by such means as reducing non-beneficial evapotranspiration including phreatophyte control, reducing reservoir and lake evaporation, improving farm efficiency, reducing irrigated acreages; and (d) controlling future development.

Salt load reductions may be accomplished by (a) plugging or sealing major salt-contributing springs, wells, or stream sources; (b) controlling salinity from irrigated lands by elimination of high salt-producing areas, decreasing flow paths of return flows, avoiding contact of heavy salt-producing areas with discharges, exporting or evaporating high salinity return flows, reducing ground water pumpage of high salinity water, and reducing seepage losses from conveyance facilities; (c) discharging high salinity municipal and industrial flow into evaporation ponds or basins or injecting into deep geologic formation; (d) constructing and operating desalinization plants if feasible methods are found.

Many engineering, economic, legal, and other problems of salinity control, together with those of establishing and enforcing standards in compatibility with compact agreements, need to be resolved. For this reason it is recommended that continued research be made in all phases of improving the quality of water. Monitoring of the quality of water at important stations (especially near state lines) is necessary in order that proper control can be maintained in implementation of the state standards.

C. Present Control Program

The increasing magnitude of the salinity problem in the Colorado River system, as well as the major gaps in existing knowledge concerning its management and control and the impact that salinity could have on future water resource developments in the Basin, have been of concern to the Bureau of Reclamation and the Federal Water Pollution Control Administration for several years. At the beginning of Fiscal Year 1968, the two agencies initiated a cooperative program of salinity control studies in the Upper Basin. One phase of these studies involves the development of a reconnaissance salinity control report for the Upper Basin. This report, scheduled for completion by the end of F.Y. 1969, will describe the nature and magnitude of known sources of salinity, evaluate the economic significance of a control program, and recommend appropriate followup feasibility studies. Similar reconnaissance studies have been proposed for the Lower Basin.

Another phase of the cooperative studies, which is being carried out concurrently with the reconnaissance activity in the Upper Basin, is aimed at demonstrating the practicability of controlling some of the less complex salinity sources. Two flowing wells on White River and Piceance Creek near Meeker, Colorado, have already been controlled during this phase of the study.

Upon completion of these reconnaissance and feasibility studies where control is clearly indicated, it is anticipated that the Bureau of Reclamation and Federal Water Pollution Control Administration will request authorization to carry out a basinwide salinity control program.

D. Future Work

Steps are being taken to launch a research study that will attempt to predict the quality of return flow water from irrigated land.

PART X. CONCLUSIONS

These studies indicate an overall increase in the concentration of total dissolved solids at the various points on the Colorado River and/or its tributaries under the conditions described, but the quality of water will still be acceptable for present and projected uses.

The addition of large storage units throughout the entire basin will stabilize the quality of water conditions during the year at many new points in the basin and dampen out the longtime fluctuations in water quality. Precipitation of total dissolved solids in the larger reservoirs will offset some of the addition to the stream system caused by inbasin use.

Operation of the many new reservoirs in the basin will permit increased accuracy in the forecasting of the quality of water delivered to the many projects and points of diversion in the basin.

The tributaries with exceptionally high dissolved-solids content have minor effect on the dissolved-solids concentration of the Colorado River as the volume of water and total tonnage of dissolved material represent only a very small portion of the total.

The special studies of irrigation projects that have been undertaken and their effect on the chemical quality of water permit these preliminary conclusions:

1. The early years of irrigation are generally the most detrimental to downstream water quality. This is primarily due to an abundance of soluble salts not previously exposed to a large amount of water.

2. Firm determinations cannot be made during the early years of development regarding the ultimate effect of irrigation. The primary factors in establishing equilibrium are the availability of soluble salts in the soils, the capacity of the ground water reservoirs, and the uniformity of irrigation practice in the area in question.

3. Each irrigated area has a different effect on quality depending upon properties of the soils and substrata in the drainage area, number of years the land has been irrigated, number of times return flow is reused, nature of the aquifers, rainfall, amount of dilution caused by surface wastes, temperature, storage reservoirs, vegetation, and types of return flow channels.

4. It must be recognized that there is a vast salt load existing in the streams and rivers due to natural conditions.

CONCLUSIONS

5. Future studies should consider other aspects of water quality effects, such as ion exchange, selective precipitation of salts, and changes in chemical composition (hardness, concentrations of specific constituents, etc.) on the river systems.

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Table I

Colorado River Basin

Flow and Quality of Water Data

Green River near Green River, Wyoming

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	22	0.73	16	22	0.73	16
	Feb.	19	.74	14	19	.74	14
	March	45	.69	31	45	.69	31
	April	95	.54	51	94	.54	51
	May	174	.52	90	171	.53	91
	June	342	.34	116	338	.35	118
	July	137	.37	51	134	.40	53
	Aug.	81	.46	37	80	.49	39
	Sept.	48	.54	26	48	.58	28
	Oct.	67	.60	40	68	.60	41
	Nov.	53	.64	34	54	.65	35
	Dec.	26	.81	21	26	.85	22
	Total	1,109	.48	527	1,099	.49	539
1942	Jan.	24	.79	19	24	.79	19
	Feb.	23	.83	19	23	.83	19
	March	43	.70	30	43	.70	30
	April	200	.41	82	199	.41	82
	May	151	.50	75	149	.51	76
	June	337	.34	114	333	.35	116
	July	205	.32	66	201	.34	68
	Aug.	58	.52	30	55	.58	32
	Sept.	32	.62	20	31	.71	22
	Oct.	29	.76	22	30	.77	23
	Nov.	26	.81	21	27	.81	22
	Dec.	26	.77	20	27	.78	21
	Total	1,154	.45	518	1,142	.46	530
1943	Jan.	27	.78	21	27	.78	21
	Feb.	29	.76	22	29	.76	22
	March	59	.63	37	59	.63	37
	April	200	.41	82	199	.41	82
	May	237	.39	93	235	.40	94
	June	476	.29	138	472	.30	140
	July	359	.25	90	355	.26	92
	Aug.	121	.39	47	118	.42	49
	Sept.	50	.54	27	49	.59	29
	Oct.	48	.67	32	49	.67	33
	Nov.	43	.67	29	44	.68	30
	Dec.	30	.77	23	31	.77	24
	Total	1,680	.38	641	1,668	.39	653
1944	Jan.	25	.80	20	25	.80	20
	Feb.	25	.80	20	25	.80	20
	March	31	.77	24	31	.77	24
	April	267	.37	99	266	.37	99
	May	155	.46	71	152	.47	72
	June	351	.33	116	347	.34	118
	July	230	.30	69	226	.31	71
	Aug.	60	.50	30	57	.56	32
	Sept.	31	.65	20	30	.73	22
	Oct.	38	.71	27	39	.72	28
	Nov.	31	.74	23	32	.75	24
	Dec.	21	.81	17	22	.82	18
	Total	1,265	.42	536	1,252	.44	548
1945	Jan.	24	.79	19	24	.79	19
	Feb.	27	.74	20	27	.74	20
	March	41	.68	28	41	.68	28
	April	78	.58	45	77	.58	45
	May	111	.52	58	108	.55	59
	June	245	.38	93	241	.39	95
	July	284	.28	80	280	.29	82
	Aug.	125	.39	49	122	.42	51
	Sept.	76	.45	34	75	.48	36
	Oct.	64	.62	40	65	.63	41
	Nov.	42	.69	29	43	.70	30
	Dec.	33	.73	24	34	.74	25
	Total	1,150	.45	519	1,137	.47	531
1946	Jan.	32	.75	24	32	.75	24
	Feb.	26	.77	20	26	.77	20
	March	65	.62	40	65	.62	40
	April	131	.48	63	130	.48	63
	May	212	.41	87	208	.42	88
	June	320	.34	109	314	.35	111
	July	153	.35	54	148	.38	56
	Aug.	74	.47	35	70	.53	37
	Sept.	52	.52	27	52	.56	29
	Oct.	58	.64	37	60	.63	38
	Nov.	51	.67	34	52	.67	35
	Dec.	51	.67	34	52	.67	35
	Total	1,225	.46	564	1,209	.48	576
1947	Jan.	26	0.81	21	26	0.81	21
	Feb.	30	.73	22	30	.73	22
	March	141	.47	66	141	.47	66
	April	75	.57	43	74	.58	43
	May	368	.33	121	362	.34	122
	June	501	.29	145	492	.30	147
	July	327	.26	85	319	.27	87
	Aug.	199	.32	64	194	.34	66
	Sept.	81	.44	36	81	.47	38
	Oct.	75	.59	44	78	.58	45
	Nov.	59	.63	37	61	.62	38
	Dec.	44	.68	30	46	.67	31
	Total	1,926	.37	714	1,904	.38	726
1948	Jan.	38	.71	27	38	.71	27
	Feb.	33	.73	24	33	.73	24
	March	64	.62	40	64	.62	40
	April	95	.54	51	94	.54	51
	May	187	.43	80	185	.44	81
	June	396	.31	123	394	.32	125
	July	121	.39	47	119	.41	49
	Aug.	56	.52	29	54	.57	31
	Sept.	32	.62	20	32	.69	22
	Oct.	36	.72	26	37	.73	27
	Nov.	29	.76	22	29	.79	23
	Dec.	26	.81	21	26	.85	22
	Total	1,113	.46	510	1,105	.47	522
1949	Jan.	27	.78	21	27	.78	21
	Feb.	24	.79	19	24	.79	19
	March	45	.69	31	45	.69	31
	April	104	.52	54	103	.52	54
	May	211	.41	86	202	.43	87
	June	372	.32	119	358	.34	121
	July	179	.36	64	167	.40	66
	Aug.	65	.48	31	59	.56	33
	Sept.	38	.58	22	37	.65	24
	Oct.	52	.65	34	57	.61	35
	Nov.	54	.65	35	58	.62	36
	Dec.	34	.74	25	37	.70	26
	Total	1,205	.45	541	1,174	.47	553
1950	Jan.	29	.79	23	29	.79	23
	Feb.	33	.73	24	33	.73	24
	March	102	.53	54	102	.53	54
	April	251	.38	95	250	.38	95
	May	270	.37	100	258	.39	101
	June	582	.34	200	563	.36	202
	July	427	.23	98	410	.24	100
	Aug.	140	.37	52	131	.41	54
	Sept.	76	.45	34	75	.48	36
	Oct.	66	.61	40	73	.56	41
	Nov.	71	.59	42	76	.57	43
	Dec.	49	.65	32	53	.62	33
	Total	2,096	.38	794	2,053	.39	806
1951	Jan.	34	.74	25	34	.74	25
	Feb.	47	.66	31	47	.66	31
	March	70	.59	41	70	.59	41
	April	154	.45	69	153	.45	69
	May	317	.35	111	310	.36	112
	June	528	.28	148	518	.29	150
	July	349	.25	87	341	.26	89
	Aug.	208	.28	58	203	.30	60
	Sept.	91	.43	39	91	.45	41
	Oct.	81	.53	43	84	.52	44
	Nov.	50	.68	34	53	.66	35
	Dec.	43	.70	30	45	.69	31
	Total	1,972	.36	716	1,949	.37	728
1952	Jan.	41	.63	26	41	.63	26
	Feb.	42	.62	26	42	.62	26
	March	52	.63	33	52	.63	33
	April	190	.52	99	189	.52	99
	May	348	.32	111	345	.32	112
	June	399	.27	108	394	.28	110
	July	171	.33	56	166	.35	58
	Aug.	99	.38	38	96	.41	40
	Sept.	57	.51	29	57	.54	31
	Oct.	42	.64	27	43	.65	28
	Nov.	28	.82	23	29	.83	24
	Dec.	27	.78	21	28	.79	22
	Total	1,496	.40	597	1,482	.41	609

Table I

Colorado River Basin

Flow and Quality of Water Data

Green River near Green River, Wyoming

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	32	0.69	22	32	0.69	22
	Feb.	33	.70	23	33	.70	23
	March	44	.68	30	44	.68	30
	April	77	.58	45	76	.59	45
	May	74	.57	42	69	.62	43
	June	381	.28	107	373	.29	109
- 1953	July	206	.29	60	199	.31	62
	Aug.	104	.39	41	100	.43	43
	Sept.	39	.56	22	39	.62	24
	Oct.	34	.74	25	36	.72	26
	Nov.	36	.75	27	38	.74	28
	Dec.	24	.88	21	26	.85	22
	Total	1,084	.43	465	1,065	.45	477
	Jan.	26	.81	21	26	.81	21
	Feb.	27	.74	20	27	.74	20
	March	48	.67	32	48	.67	32
	April	88	.55	48	87	.55	48
	May	282	.28	79	275	.29	80
	June	232	.30	70	220	.33	72
- 1954	July	250	.25	62	240	.27	64
	Aug.	86	.40	34	81	.44	36
	Sept.	47	.55	26	46	.61	28
	Oct.	40	.68	27	44	.64	28
	Nov.	39	.69	27	42	.67	28
	Dec.	18	.89	16	20	.85	17
	Total	1,183	.39	462	1,156	.41	474
	Jan.	20	.80	16	20	.80	16
	Feb.	20	.80	16	20	.80	16
	March	33	.76	25	33	.76	25
	April	74	.59	44	73	.60	44
	May	127	.39	50	121	.42	51
	June	245	.27	66	235	.28	67
- 1955	July	116	.36	42	106	.41	44
	Aug.	68	.41	28	63	.48	30
	Sept.	35	.57	20	34	.62	21
	Oct.	33	.70	23	36	.67	24
	Nov.	28	.79	22	31	.74	23
	Dec.	39	.74	29	41	.73	30
	Total	837	.46	381	812	.48	391
	Jan.	42	.69	29	42	.69	29
	Feb.	29	.66	19	29	.66	19
	March	91	.56	51	91	.56	51
	April	158	.45	71	157	.45	71
	May	310	.37	115	297	.39	116
	June	555	.25	139	533	.26	141
- 1956	July	197	.31	61	178	.35	63
	Aug.	98	.38	37	88	.44	39
	Sept.	41	.56	23	40	.60	24
	Oct.	39	.59	23	46	.52	24
	Nov.	35	.69	24	41	.61	25
	Dec.	26	.77	20	31	.68	21
	Total	1,621	.38	612	1,573	.40	623
	Jan.	22	.77	17	22	.77	17
	Feb.	37	.70	26	37	.70	26
	March	57	.68	39	57	.68	39
	April	60	.62	37	59	.63	37
	May	176	.46	81	172	.47	81
	June	476	.27	129	469	.28	130
- 1957	July	380	.25	95	373	.26	96
	Aug.	117	.35	41	113	.37	42
	Sept.	68	.47	32	68	.48	33
	Oct.	66	.55	36	68	.54	37
	Nov.	48	.67	32	50	.66	33
	Dec.	41	.71	29	42	.71	30
	Total	1,548	.38	594	1,530	.39	601
	Jan.	33	.76	25	33	.76	25
	Feb.	47	.66	31	47	.66	31
	March	51	.63	32	51	.63	32
	April	99	.56	55	98	.56	55
	May	291	.31	90	289	.31	90
	June	266	.31	83	263	.32	84
- 1958	July	76	.45	34	73	.48	35
	Aug.	51	.53	27	49	.57	28
	Sept.	36	.64	23	36	.67	24
	Oct.	33	.79	26	34	.76	26
	Nov.	32	.78	25	33	.76	25
	Dec.	31	.74	23	31	.74	23
	Total	1,046	.45	474	1,041	.46	478
	Jan.	24	0.71	17	24	0.71	17
	Feb.	25	.72	18	25	.72	18
	March	49	.65	32	49	.65	32
	April	73	.64	47	72	.65	47
	May	79	.51	40	78	.51	40
	June	322	.26	84	321	.26	84
- 1959	July	140	.34	48	139	.35	48
	Aug.	79	.40	32	78	.41	32
	Sept.	42	.55	23	42	.55	23
	Oct.	51	.57	29	51	.57	29
	Nov.	42	.60	25	42	.60	25
	Dec.	27	.74	20	27	.74	20
	Total	953	.44	415	948	.44	415
	Jan.	27	.74	20	27	.74	20
	Feb.	23	.78	18	23	.78	18
	March	75	.53	40	75	.53	40
	April	84	.49	41	83	.49	41
	May	66	.48	32	65	.49	32
	June	173	.30	52	172	.30	52
- 1960	July	68	.43	29	67	.43	29
	Aug.	38	.45	17	37	.46	17
	Sept.	28	.54	15	28	.54	15
	Oct.	42	.57	24	42	.57	24
	Nov.	47	.49	23	47	.49	23
	Dec.	27	.69	18	27	.69	18
	Total	698	.47	329	693	.47	329
	Jan.	20	.60	12	20	.60	12
	Feb.	19	.58	11	19	.58	11
	March	30	.57	17	30	.57	17
	April	50	.60	30	49	.61	30
	May	60	.43	26	59	.44	26
	June	162	.27	44	161	.27	44
- 1961	July	47	.43	20	46	.43	20
	Aug.	35	.43	15	34	.44	15
	Sept.	39	.46	18	39	.46	18
	Oct.	41	.51	21	41	.51	21
	Nov.	29	.52	15	29	.52	15
	Dec.	27	.52	14	27	.52	14
	Total	559	.43	243	554	.44	243
	Jan.	32	.47	15	32	.47	15
	Feb.	48	.48	23	48	.48	23
	March	77	.51	38	77	.51	38
	April	203	.43	87	202	.43	87
	May	256	.36	92	255	.36	92
	June	355	.27	96	354	.27	96
- 1962	July	250	.27	68	249	.27	68
	Aug.	94	.37	35	93	.38	35
	Sept.	38	.58	22	38	.58	22
	Oct.	38	.63	24	38	.63	24
	Nov.	35	.66	23	35	.66	23
	Dec.	25	.88	22	25	.88	22
	Total	1,451	.38	545	1,446	.38	545
	Jan.	18	.72	13	18	.72	13
	Feb.	18	.72	13	18	.72	13
	March	42	.67	28	42	.67	28
	April	51	.63	32	50	.64	32
	May	100	.45	45	99	.45	45
	June	337	.26	88	336	.26	88
- 1963	July	143	.32	46	142	.32	46
	Aug.	76	.47	36	75	.48	36
	Sept.	77	.43	33	77	.43	33
	Oct.	58	.50	29	58	.50	29
	Nov.	52	.60	31	52	.60	31
	Dec.	30	.60	18	30	.60	18
	Total	1,002	.41	412	997	.41	412
	Jan.	23	.56	13	23	.56	13
	Feb.	22	.59	13	22	.59	13
	March	29	.59	17	29	.59	17
	April	68	.56	38	68	.56	38
	May	138	.32	44	138	.32	44
	June	323	.38	123	323	.38	123
- 1964	July	335	.26	87	335	.26	87
	Aug.	87	.39	34	87	.39	34
	Sept.	37	.65	24	37	.65	24
	Oct.	24	.92	22	24	.92	22
	Nov.	25	.88	22	25	.88	22
	Dec.	25	.84	21	25	.84	21
	Total	1,136	.40	458	1,136	.40	458

Table I

Colorado River Basin

Flow and Quality of Water Data

Green River near Green River, Wyoming

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1965	Jan.	28	0.79	22	28	0.79	22
	Feb.	30	.70	21	30	.70	21
	March	38	.74	28	38	.74	28
	April	44	.86	38	44	.86	38
	May	94	.60	56	94	.60	56
	June	429	.38	163	429	.38	163
	July	466	.30	140	466	.30	140
	Aug.	184	.36	66	184	.36	66
	Sept.	461	.41	189	461	.41	189
	Oct.	86	.73	63	86	.73	63
	Nov.	75	.65	49	75	.65	49
	Dec.	29	.90	26	29	.90	26
	Total	1,964	.44	861	1,964	.44	861
	Jan.						
	Feb.						
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	July						
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	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1966	Jan.	37	0.76	28	37	0.76	28
	Feb.	35	.77	27	35	.77	27
	March	88	.72	63	88	.72	63
	April	138	.50	69	138	.50	69
	May	160	.39	62	160	.39	62
	June	171	.31	53	171	.31	53
	July	91	.43	39	91	.43	39
	Aug.	56	.52	29	56	.52	29
	Sept.	45	.60	27	45	.60	27
	Oct.	35	.77	27	35	.77	27
	Nov.	30	.83	25	30	.83	25
	Dec.	25	.96	24	25	.96	24
	Total	911	.52	473	911	.52	473
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	March						
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	Dec.						
	Total						

Table I
Colorado River Basin
Flow and Quality of Water Data
Green River near Green River, Wyoming
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	1,109	0.48	527	1,099	0.49	539
1942	1,154	.45	518	1,142	.46	530
1943	1,680	.38	641	1,668	.39	653
1944	1,265	.42	536	1,252	.44	548
1945	1,150	.45	519	1,137	.47	531
1946	1,225	.46	564	1,209	.48	576
1947	1,926	.37	714	1,904	.38	726
1948	1,113	.46	510	1,105	.47	522
1949	1,205	.45	541	1,174	.47	553
1950	2,096	.38	794	2,053	.39	806
1951	1,972	.36	716	1,949	.37	728
1952	1,496	.40	597	1,482	.41	609
1953	1,084	.43	465	1,065	.45	477
1954	1,183	.39	462	1,156	.41	474
1955	837	.46	381	812	.48	391
1956	1,621	.38	612	1,573	.40	623
1957	1,548	.38	594	1,530	.39	601
1958	1,046	.45	474	1,041	.46	478
1959	953	.44	415	948	.44	415
1960	698	.47	329	693	.47	329
1961	559	.43	243	554	.44	243
1962	1,451	.38	545	1,446	.38	545
1963	1,002	.41	412	997	.41	412
1964	1,136	.40	458	1,136	.40	458
1965	1,964	.44	861	1,964	.44	861
1966	911	.52	473	911	.52	473
Total	33,384		13,901	33,000		14,101
Average	1,284	0.42	535	1,269	0.43	542

Sampled quality record May 1951 to December 1966; remainder by correlation.
Measured flow record January 1941 to September 1945; and April 1951 to December 1966; remainder by correlation.

Table 2

Colorado River Basin

Flow and Quality of Water Data

Green River near Greendale, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	27	0.93	25	26	0.96	25
	Feb.	25	1.16	29	24	1.21	29
	March	72	.94	68	69	.99	68
	April	131	.56	74	125	.59	74
	May	276	.58	160	263	.61	161
	June	441	.40	175	425	.42	177
-1941	July	171	.55	94	158	.61	96
	Aug.	110	.73	80	102	.80	82
	Sept.	67	.78	52	61	.89	54
	Oct.	94	.97	91	92	1.00	92
	Nov.	71	.93	66	71	.94	67
	Dec.	36	1.19	43	35	1.26	44
	Total	1,521	.63	957	1,451	.67	969
	Jan.	30	1.00	30	29	1.03	30
	Feb.	31	1.00	31	30	1.03	31
	March	69	1.07	74	66	1.12	74
	April	261	.65	170	255	.67	170
	May	235	.76	180	223	.81	181
	June	434	.44	193	418	.47	195
-1942	July	239	.40	97	225	.44	99
	Aug.	73	.57	42	63	.70	44
	Sept.	40	.72	29	33	.94	31
	Oct.	36	1.00	36	34	1.09	37
	Nov.	35	1.17	41	35	1.20	42
	Dec.	34	1.06	36	34	1.09	37
	Total	1,517	.63	959	1,445	.67	971
	Jan.	33	1.09	36	32	1.12	36
	Feb.	37	.97	36	36	1.00	36
	March	96	.74	71	93	.76	71
	April	262	.48	125	256	.49	125
	May	338	.38	130	326	.40	131
	June	552	.33	182	536	.34	184
-1943	July	393	.29	115	379	.31	117
	Aug.	163	.47	76	153	.51	78
	Sept.	64	.56	36	57	.67	38
	Oct.	60	.72	43	58	.76	44
	Nov.	54	.83	45	54	.85	46
	Dec.	37	.89	33	37	.92	34
	Total	2,089	.44	928	2,017	.47	940
	Jan.	30	.93	28	29	.97	28
	Feb.	32	1.00	32	31	1.03	32
	March	48	1.48	71	45	1.58	71
	April	345	.55	190	339	.56	190
	May	245	.58	142	232	.62	143
	June	469	.37	174	453	.39	176
-1944	July	278	.39	109	264	.42	111
	Aug.	76	.49	37	66	.59	39
	Sept.	36	.61	22	29	.83	24
	Oct.	47	.83	39	45	.89	40
	Nov.	39	.92	36	39	.95	37
	Dec.	27	.85	23	27	.89	24
	Total	1,672	.54	903	1,599	.57	915
	Jan.	29	.97	28	28	1.00	28
	Feb.	34	.94	32	33	.97	32
	March	65	.88	57	62	.92	57
	April	113	.70	79	107	.74	79
	May	176	.60	105	163	.65	106
	June	310	.46	144	294	.50	146
-1945	July	325	.37	120	311	.39	122
	Aug.	174	.47	82	164	.51	84
	Sept.	103	.43	44	96	.48	46
	Oct.	74	.74	55	72	.78	56
	Nov.	52	.88	46	52	.90	47
	Dec.	42	.81	34	42	.83	35
	Total	1,497	.55	826	1,424	.59	838
	Jan.	39	.90	35	38	.92	35
	Feb.	33	.85	28	32	.87	28
	March	88	.67	59	85	.69	59
	April	237	.48	115	231	.50	115
	May	298	.44	130	284	.46	131
	June	354	.37	133	336	.40	135
-1946	July	162	.40	64	147	.45	66
	Aug.	81	.57	46	70	.69	48
	Sept.	62	.60	37	56	.70	39
	Oct.	68	.76	52	67	.79	53
	Nov.	63	.82	52	63	.84	53
	Dec.	62	.77	48	62	.79	49
	Total	1,547	.52	799	1,471	.55	811
	Jan.	32	0.81	26	31	0.84	26
	Feb.	37	.89	33	36	.92	33
	March	195	.62	120	192	.62	120
	April	136	.62	84	130	.65	84
	May	521	.40	210	505	.42	211
	June	628	.36	225	607	.37	227
-1947	July	372	.35	131	354	.38	133
	Aug.	218	.45	99	206	.49	101
	Sept.	91	.53	48	85	.59	50
	Oct.	90	.70	63	90	.71	64
	Nov.	71	.77	55	72	.78	56
	Dec.	56	.87	49	57	.88	50
	Total	2,447	.47	1,143	2,365	.49	1,155
	Jan.	47	.91	43	46	.94	43
	Feb.	40	.88	35	39	.90	35
	March	102	.79	81	99	.82	81
	April	157	.70	110	151	.73	110
	May	336	.38	126	324	.39	127
	June	454	.36	162	440	.37	164
-1948	July	126	.50	63	114	.57	65
	Aug.	59	.56	33	50	.70	35
	Sept.	33	.76	25	27	1.00	27
	Oct.	39	.77	30	37	.84	31
	Nov.	34	.85	29	33	.91	30
	Dec.	31	1.00	31	30	1.06	32
	Total	1,458	.53	768	1,390	.56	780
	Jan.	31	.90	28	30	.93	28
	Feb.	29	.93	27	28	.96	27
	March	73	.89	65	70	.93	65
	April	152	.69	105	146	.72	105
	May	310	.53	165	291	.57	166
	June	493	.47	230	465	.50	232
-1949	July	205	.52	106	183	.59	108
	Aug.	72	.61	44	61	.75	46
	Sept.	42	.74	31	35	.94	33
	Oct.	70	.93	65	72	.92	66
	Nov.	66	.97	64	69	.94	65
	Dec.	40	.97	39	42	.95	40
	Total	1,583	.61	969	1,492	.66	981
	Jan.	36	1.19	43	35	1.23	43
	Feb.	45	.95	43	44	.98	43
	March	150	.61	92	147	.63	92
	April	323	.46	150	317	.47	150
	May	416	.46	190	394	.49	191
	June	741	.37	275	710	.39	277
-1950	July	458	.34	154	430	.36	156
	Aug.	153	.51	78	138	.58	80
	Sept.	86	.62	53	79	.70	55
	Oct.	76	.72	55	80	.70	56
	Nov.	80	.75	60	84	.73	61
	Dec.	61	.84	51	64	[illegible]	52
	Total	2,625	.47	1,244	2,522	.50	1,256
	Jan.	45	.80	36	44	.82	36
	Feb.	61	.82	50	60	.83	50
	March	93	.78	73	90	.81	73
	April	212	.47	100	206	.49	100
	May	395	.45	177	378	.47	178
	June	626	.36	225	604	.38	227
-1951	July	366	.36	132	348	.38	134
	Aug.	228	.44	101	216	.48	103
	Sept.	98	.56	55	92	.62	57
	Oct.	99	.71	70	99	.72	71
	Nov.	57	.91	52	59	.90	53
	Dec.	54	.87	47	55	.87	48
	Total	2,334	.48	1,118	2,251	.50	1,130
	Jan.	49	.82	40	48	.83	40
	Feb.	52	.81	42	51	.82	42
	March	63	.75	47	60	.78	47
	April	318	.62	198	312	.63	198
	May	600	.39	235	587	.40	236
	June	554	.36	201	537	.38	203
-1952	July	205	.56	114	190	.61	116
	Aug.	121	.60	72	111	.67	74
	Sept.	67	.67	45	61	.77	47
	Oct.	49	.86	42	47	.91	43
	Nov.	37	1.11	41	37	1.14	42
	Dec.	34	1.18	40	34	1.21	41
	Total	2,149	.52	1,117	2,075	.54	1,129

Table 2

Colorado River Basin

Flow and Quality of Water Data

Green River near Greendale, Utah

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	48	0.81	39	47	0.83	39
	Feb.	48	.85	41	47	.87	41
	March	73	.86	63	70	.90	63
	April	96	.76	73	90	.81	73
	May	110	.64	70	95	.75	71
	June	452	.39	175	432	.41	177
-1953	July	198	.39	77	181	.44	79
	Aug.	105	.54	57	94	.63	59
	Sept.	43	.63	27	37	.78	29
	Oct.	35	.89	31	34	.94	32
	Nov.	42	.98	41	43	.98	42
	Dec.	32	.97	31	33	.97	32
	Total	1,282	.57	725	1,203	.61	737
	Jan.	28	1.11	31	27	1.15	31
	Feb.	39	.87	34	38	.89	34
	March	62	.81	50	59	.85	50
	April	101	.65	66	95	.69	66
	May	302	.31	94	285	.33	95
	June	223	.36	81	199	.42	83
-1954	July	265	.28	73	245	.31	75
	Aug.	81	.43	35	69	.54	37
	Sept.	45	.69	31	38	.87	33
	Oct.	42	.95	40	43	.95	41
	Nov.	41	.85	35	43	.84	36
	Dec.	20	1.05	21	21	1.05	22
	Total	1,249	.47	591	1,162	.52	603
	Jan.	24	.75	18	23	.78	18
	Feb.	24	.71	17	23	.74	17
	March	44	1.11	49	41	1.20	49
	April	106	.64	68	100	.68	68
	May	168	.52	88	152	.59	89
	June	288	.33	95	262	.37	96
-1955	July	130	.38	49	113	.45	51
	Aug.	80	.52	42	69	.64	44
	Sept.	38	.58	22	31	.74	23
	Oct.	38	.68	26	38	.71	27
	Nov.	36	.75	27	38	.74	28
	Dec.	45	.82	37	46	.83	38
	Total	1,021	.53	538	936	.59	548
	Jan.	50	.86	43	49	.88	43
	Feb.	38	.76	29	37	.78	29
	March	150	.47	70	147	.48	70
	April	203	.43	87	197	.44	87
	May	368	.39	144	340	.43	145
	June	615	.29	178	570	.32	180
-1956	July	207	.33	69	189	.38	71
	Aug.	104	.42	44	92	.50	46
	Sept.	48	.44	21	41	.54	22
	Oct.	46	.74	34	50	.70	35
	Nov.	39	.82	32	44	.75	33
	Dec.	26	.88	23	30	.80	24
	Total	1,894	.41	774	1,786	.44	785
	Jan.	28	.86	24	27	.89	24
	Feb.	43	.79	34	42	.81	34
	March	66	.91	60	63	.95	60
	April	86	.67	58	80	.72	58
	May	275	.54	148	261	.57	148
	June	685	.37	251	666	.38	252
-1957	July	433	.36	155	416	.37	156
	Aug.	142	.57	81	131	.63	82
	Sept.	82	.58	48	76	.64	49
	Oct.	77	.69	53	76	.71	54
	Nov.	57	1.00	57	58	1.00	58
	Dec.	46	.91	42	46	.93	43
	Total	2,020	.50	1,011	1,942	.52	1,018
	Jan.	43	.77	33	42	.79	33
	Feb.	55	.80	44	54	.81	44
	March	66	.71	47	63	.75	47
	April	134	.67	90	128	.70	90
	May	386	.39	151	374	.40	151
-1958	June	335	.38	127	320	.40	128
	July	87	.50	44	74	.61	45
	Aug.	57	.56	32	48	.69	33
	Sept.	39	.69	27	33	.85	28
	Oct.	36	.72	26	34	.76	26
	Nov.	34	.70	24	34	.71	24
	Dec.	38	.84	32	37	.86	32
	Total	1,310	.52	677	1,241	.55	681
	Jan.	29	0.86	25	28	0.89	25
	Feb.	32	.91	29	31	.94	29
	March	65	.92	60	62	.97	60
	April	98	.71	70	92	.76	70
	May	115	.57	66	104	.63	66
	June	368	.36	132	355	.37	132
-1959	July	176	.51	90	165	.55	90
	Aug.	93	.47	44	85	.52	44
	Sept.	58	.79	46	52	.88	46
	Oct.	68	.72	49	65	.75	49
	Nov.	51	.76	39	50	.78	39
	Dec.	37	.99	37	36	1.03	37
	Total	1,190	.58	687	1,125	.61	687
	Jan.	26	.81	21	25	.84	21
	Feb.	29	.86	25	28	.89	25
	March	149	.70	104	146	.71	104
	April	140	.55	77	134	.57	77
	May	127	.58	74	116	.64	74
	June	216	.43	93	203	.46	93
-1960	July	78	.49	38	67	.57	38
	Aug.	43	.47	20	35	.57	20
	Sept.	35	.56	20	29	.69	20
	Oct.	49	.65	32	46	.70	32
	Nov.	54	.67	36	53	.68	36
	Dec.	27	.84	23	26	.88	23
	Total	973	.58	563	908	.62	563
	Jan.	27	.73	20	26	.77	20
	Feb.	27	.77	21	26	.81	21
	March	64	.86	55	61	.90	55
	April	76	.69	52	70	.74	52
	May	79	.59	47	68	.69	47
	June	192	.32	61	179	.34	61
-1961	July	56	.44	25	45	.56	25
	Aug.	43	.58	25	35	.71	25
	Sept.	55	.68	37	49	.75	37
	Oct.	64	.70	45	61	.74	45
	Nov.	54	.70	38	53	.72	38
	Dec.	44	.78	34	43	.79	34
	Total	781	.59	460	716	.64	460
	Jan.	43	.65	28	42	.67	28
	Feb.	83	.81	67	82	.82	67
	March	150	.84	126	147	.86	126
	April	374	.55	206	368	.56	206
	May	394	.41	162	383	.42	162
	June	456	.40	182	443	.41	182
-1962	July	297	.39	116	286	.41	116
	Aug.	109	.48	52	101	.51	52
	Sept.	44	.64	28	38	.74	28
	Oct.	48	.79	38	45	.84	38
	Nov.	5	.80	4	4	1.00	4
	Dec.	16	.94	15	15	1.00	15
	Total	2,019	.51	1,024	1,954	.52	1,024
	Jan.	23	.91	21	23	.91	21
	Feb.	26	.92	24	26	.92	24
	March	6	.83	5	3	1.67	5
	April	8	.87	7	2	3.50	7
	May	8	.87	7	0	0	0
	June	7	.86	6	0	0	0
-1963	July	6	.83	5	0	0	0
	Aug.	6	.83	5	0	0	0
	Sept.	7	.86	6	1	6.00	6
	Oct.	8	.87	7	4	1.75	7
	Nov.	19	.58	11	17	.65	11
	Dec.	46	.63	29	46	.63	29
	Total	170	.78	133	122	.90	110
	Jan.	58	.57	33	58	.57	33
	Feb.	56	.57	32	56	.57	32
	March	37	.59	22	35	.63	22
	April	35	.63	22	32	.69	22
	May	91	.64	58	86	.67	58
	June	86	.60	52	81	.64	52
-1964	July	150	.61	92	147	.63	92
	Aug.	122	.61	74	121	.61	74
	Sept.	131	.61	80	130	.62	80
	Oct.	159	.64	102	159	.64	102
	Nov.	139	.60	83	139	.60	83
	Dec.	194	.62	120	194	.62	120
	Total	1,258	.61	770	1,238	.62	770

Table 2

Colorado River Basin

Flow and Quality of Water Data

Green River near Greendale, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	216	0.63	136	216	0.63	136
	Feb.	213	.70	149	213	.70	149
	March	233	1.05	245	231	1.06	245
	April	204	.83	169	201	.84	169
	May	66	.80	53	61	.87	53
	June	86	.86	74	81	.91	74
-1965	July	29	.86	25	26	.96	25
	Aug.	31	.87	27	30	.90	27
	Sept.	44	.89	39	43	.91	39
	Oct.	79	.79	62	79	.79	62
	Nov.	120	.73	88	120	.57	88
	Dec.	116	.65	75	116	.65	75
	Total	1,437	.79	1,142	1,417	.81	1,142

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	72	0.64	46	72	0.64	46
	Feb.	72	.65	47	72	.65	47
	March	71	.76	54	71	.76	54
	April	130	.79	103	130	.79	103
	May	83	.78	65	83	.78	65
	June	95	.76	72	[illegible]	.76	72
-1966	July	104	.75	78	[illegible]	.75	78
	Aug.	118	.72	85	118	.72	85
	Sept.	124	.73	91	[illegible]	.73	91
	Oct.	124	.77	95	[illegible]	.77	95
	Nov.	85	.81	69	[illegible]	.81	69
	Dec.	111	.76	84	111	.76	84
	Total	1,189	.75	889	1,189	.75	889

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 2
Colorado River Basin
Flow and Quality of Water Data
Green River near Greendale, Utah
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	1,521	0.63	957	1,451	0.67	969
1942	1,517	.63	959	1,445	.67	971
1943	2,089	.44	928	2,017	.47	940
1944	1,672	.54	903	1,599	.57	915
1945	1,497	.55	826	1,424	.59	838
1946	1,547	.52	799	1,471	.55	811
1947	2,447	.47	1,143	2,365	.49	1,155
1948	1,458	.53	768	1,390	.56	780
1949	1,583	.61	969	1,492	.66	981
1950	2,625	.47	1,244	2,522	.50	1,256
1951	2,334	.48	1,118	2,251	.50	1,130
1952	2,149	.52	1,117	2,075	.54	1,129
1953	1,282	.57	725	1,203	.61	737
1954	1,249	.47	591	1,162	.52	603
1955	1,021	.53	538	936	.59	548
1956	1,894	.41	774	1,786	.44	785
1957	2,020	.50	1,011	1,942	.52	1,018
1958	1,310	.52	677	1,241	.55	681
1959	1,190	.58	687	1,125	.61	687
1960	973	.58	563	908	.62	563
1961	781	.59	460	716	.64	460
1962	2,019	.51	1,024	1,954	.52	1,024
1963	170	.78	133	122	.90	110
1964	1,258	.61	770	1,238	.62	770
1965	1,437	.79	1,142	1,417	.81	1,142
1966	1,189	.75	889	1,189	.75	889
Total	40,232		21,715	38,441		21,892
Average	1,547	0.54	835	1,479	0.57	842

Sampled quality record October 1956 to December 1966 (fragmentary); remainder by correlation.
Measured flow record entire period.

Table 3

Colorado River Basin

Flow and Quality of Water Data

Duchesne River near Randlett, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concen-tration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concen-tration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	25	1.12	28	25	1.12	28
	Feb.	24	1.29	31	24	1.29	31
	March	21	1.71	36	21	1.71	36
	April	20	1.50	30	17	1.76	30
	May	155	.50	78	139	.56	78
	June	232	.38	88	214	.41	87
-1941	July	35	1.11	39	30	1.30	39
	Aug.	18	1.50	27	16	1.69	27
	Sept.	15	1.60	24	13	1.85	24
	Oct.	54	.93	50	53	.94	50
	Nov.	51	.90	46	50	.92	46
	Dec.	44	1.04	46	44	1.04	46
	Total	694	.75	523	646	.81	522
	Jan.	40	.90	36	40	.90	36
	Feb.	39	1.00	39	39	1.00	39
	March	39	1.23	48	39	1.23	48
	April	50	.90	45	48	.94	45
	May	83	.72	60	71	.85	60
	June	171	.46	79	158	.49	78
-1942	July	23	1.43	33	19	1.74	33
	Aug.	8	2.12	17	7	2.42	17
	Sept.	5	2.40	12	4	3.00	12
	Oct.	18	1.50	27	17	1.59	27
	Nov.	22	1.41	31	21	1.48	31
	Dec.	28	1.28	36	28	1.28	36
	Total	526	.88	463	491	.94	462
	Jan.	26	1.12	29	26	1.12	29
	Feb.	29	1.17	34	29	1.17	34
	March	29	1.51	44	29	1.52	44
	April	43	1.00	43	40	1.07	43
	May	100	.64	64	85	.75	64
	June	103	.62	64	86	.73	63
-1943	July	28	1.21	34	23	1.48	34
	Aug.	23	1.39	32	21	1.52	32
	Sept.	8	2.00	16	6	2.67	16
	Oct.	22	1.40	31	21	1.48	31
	Nov.	24	1.29	31	23	1.35	31
	Dec.	25	1.28	32	25	1.28	32
	Total	460	.99	454	414	1.09	453
	Jan.	23	1.08	25	23	1.09	25
	Feb.	26	1.31	34	26	1.31	34
	March	43	1.20	52	43	1.21	52
	April	48	.94	45	45	1.00	45
	May	128	.57	73	113	.65	73
	June	255	.37	94	237	.39	93
-1944	July	82	.72	59	77	.77	59
	Aug.	8	2.00	16	6	2.67	16
	Sept.	7	2.14	15	5	3.00	15
	Oct.	24	1.37	33	23	1.43	33
	Nov.	26	1.30	34	25	1.36	34
	Dec.	28	1.32	37	28	1.32	37
	Total	698	.74	517	651	.79	516
	Jan.	30	1.00	30	30	1.00	30
	Feb.	27	1.18	32	27	1.18	32
	March	32	1.40	45	32	1.41	45
	April	24	1.29	31	22	1.41	31
	May	59	.86	51	46	1.11	51
	June	91	.67	61	77	.78	60
-1945	July	30	1.23	37	26	1.42	37
	Aug.	31	1.19	37	29	1.27	37
	Sept.	12	1.75	21	11	1.91	21
	Oct.	21	1.38	29	20	1.45	29
	Nov.	26	1.27	33	25	1.32	33
	Dec.	24	1.37	33	24	1.37	33
	Total	407	1.08	440	369	1.19	439
	Jan.	23	1.13	26	23	1.13	26
	Feb.	21	1.38	29	21	1.38	29
	March	29	1.41	41	29	1.41	41
	April	40	1.00	40	38	1.05	40
	May	70	.78	55	57	.96	55
	June	47	.95	45	31	1.42	44
-1946	July	5	2.60	13	3	4.33	13
	Aug.	6	2.33	14	5	2.80	14
	Sept.	4	2.75	11	3	3.67	11
	Oct.	17	1.53	26	16	1.62	26
	Nov.	32	1.22	39	31	1.26	39
	Dec.	30	1.20	36	30	1.20	36
	Total	324	1.16	375	287	1.30	374
	Jan.	26	1.07	[illegible]	26	1.08	28
	Feb.	36	1.08	[illegible]	36	1.08	39
	March	36	1.27	[illegible]	35	1.28	46
	April	23	1.30	[illegible]	20	1.50	30
	May	143	.53	[illegible]	127	.60	76
	June	158	.49	[illegible]	140	.55	77
-1947	July	33	1.18	39	28	1.39	39
	Aug.	25	1.28	32	23	1.39	32
	Sept.	12	1.75	21	10	2.10	21
	Oct.	17	1.65	28	16	1.75	28
	Nov.	29	1.21	35	28	1.25	35
	Dec.	31	1.19	37	31	1.19	37
	Total	569	.86	489	521	.94	488
	Jan.	29	1.00	29	29	1.00	29
	Feb.	26	1.31	34	26	1.31	34
	March	40	1.20	48	40	1.20	48
	April	31	1.23	38	29	1.31	38
	May	70	.79	55	59	.93	55
	June	51	.92	47	37	1.24	46
-1948	July	3	3.00	9	2	4.50	9
	Aug.	2	3.50	7	2	3.50	7
	Sept.	1	3.00	3	0	0	0
	Oct.	5	2.40	12	4	3.00	12
	Nov.	14	1.71	24	13	1.85	24
	Dec.	26	1.27	33	26	1.27	33
	Total	298	1.14	339	267	1.25	335
	Jan.	24	1.08	26	24	1.08	26
	Feb.	23	1.30	30	23	1.30	30
	March	44	1.20	53	44	1.20	53
	April	46	.98	45	43	1.05	45
	May	127	.56	71	111	.64	71
	June	230	.39	90	212	.42	89
-1949	July	50	.94	47	44	1.07	47
	Aug.	7	2.14	15	5	3.00	15
	Sept.	8	2.13	17	6	2.83	17
	Oct.	25	1.28	32	24	1.33	32
	Nov.	29	1.21	35	28	1.25	35
	Dec.	28	1.29	36	28	1.29	36
	Total	641	.78	497	592	.84	496
	Jan.	31	1.00	31	31	1.00	31
	Feb.	26	1.23	32	26	1.23	32
	March	40	1.30	52	40	1.30	52
	April	44	1.00	44	40	1.10	44
	May	97	.67	65	79	.81	64
	June	193	.43	83	173	.47	82
-1950	July	45	1.00	45	40	1.12	45
	Aug.	9	2.00	18	7	2.57	18
	Sept.	13	1.77	23	11	2.09	23
	Oct.	16	1.56	25	14	1.78	25
	Nov.	27	1.26	34	25	1.36	34
	Dec.	33	1.36	45	33	1.36	45
	Total	574	.87	497	519	.95	495
	Jan.	26	1.00	26	26	1.00	26
	Feb.	26	1.31	34	26	1.31	34
	March	23	1.56	36	23	1.56	36
	April	14	1.71	24	10	2.40	24
	May	79	.75	59	62	.94	58
	June	124	.73	91	105	.86	90
-1951	July	31	1.29	40	26	1.54	40
	Aug.	26	1.46	38	24	1.58	38
	Sept.	10	1.90	19	9	2.11	19
	Oct.	25	1.28	32	24	1.33	32
	Nov.	32	1.22	39	31	1.26	39
	Dec.	32	1.22	39	32	1.22	39
	Total	448	1.06	477	398	1.19	475
	Jan.	28	1.07	30	28	1.07	30
	Feb.	26	1.31	34	26	1.31	34
	March	31	1.42	44	31	1.42	44
	April	111	.60	67	106	.63	67
	May	304	.34	103	281	.36	102
	June	302	.33	100	276	.36	99
-1952	July	70	.79	55	63	.87	55
	Aug.	49	.94	46	45	1.02	46
	Sept.	30	1.20	36	28	1.28	36
	Oct.	21	1.38	29	19	1.53	29
	Nov.	26	1.31	34	24	1.42	34
	Dec.	37	1.11	41	37	1.11	41
	Total	1,035	.60	619	964	.64	617

Table 3

Colorado River Basin

Flow and Quality of Water Data

Duchesne River near Randlett, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	39	0.90	35	39	0.95	35
	Feb.	33	1.12	37	33	1.12	37
	March	34	1.41	48	34	1.41	48
	April	13	1.77	23	8	3.00	23
	May	15	1.60	24	5	4.80	24
	June	107	.60	64	94	.67	63
-1953	July	13	1.77	23	9	2.56	23
	Aug.	12	1.75	21	11	1.91	21
	Sept.	5	2.20	11	4	2.75	11
	Oct.	9	2.00	18	8	2.25	18
	Nov.	20	1.40	28	19	1.47	28
	Dec.	26	1.31	34	26	1.31	34
	Total	326	1.12	366	290	1.26	365
	Jan.	27	1.11	30	Same as historical		
	Feb.	25	1.28	32			
	March	20	1.80	36			
	April	13	1.77	23			
	May	36	1.11	40			
	June	5	2.40	12			
-1954	July	2	3.00	6			
	Aug.	1	4.00	4			
	Sept.	6	2.33	14			
	Oct.	17	1.59	27			
	Nov.	18	1.50	27			
	Dec.	18	1.50	27			
	Total	188	1.48	278			
	Jan.	25	1.08	27			
	Feb.	21	1.43	30			
	March	34	1.38	47			
	April	22	1.41	31			
	May	45	1.00	45			
	June	34	1.09	37			
-1955	July	2	3.00	6			
	Aug.	8	2.50	17			
	Sept.	4	2.50	10			
	Oct.	6	2.33	14			
	Nov.	15	1.60	24			
	Dec.	29	1.21	35			
	Total	245	1.32	323			
	Jan.	27	1.00	27			
	Feb.	23	1.35	31			
	March	25	1.60	40			
	April	17	1.59	27			
	May	74	.76	56			
	June	90	.68	61			
-1956	July	4	2.75	11			
	Aug.	2	4.00	8			
	Sept.	1	5.00	5			
	Oct.	4	2.25	9			
	Nov.	17	1.59	27			
	Dec.	19	1.21	23			
	Total	303	1.07	325			
	Jan.	21	1.05	22			
	Feb.	20	1.05	21			
	March	22	1.54	34			
	April	12	1.83	22			
	May	39	1.23	48			
	June	184	.41	76			
-1957	July	35	.91	32			
	Aug.	18	1.61	29			
	Sept.	15	1.47	22			
	Oct.	19	1.74	33			
	Nov.	41	1.41	58			
	Dec.	30	1.07	32			
	Total	456	.94	429			
	Jan.	29	.83	24			
	Feb.	31	1.00	31			
	March	35	1.37	48			
	April	29	1.07	31			
	May	141	.46	65			
	June	103	.42	43			
-1958	July	4	2.50	10			
	Aug.	1	4.00	4			
	Sept.	3	2.33	7			
	Oct.	5	2.60	13			
	Nov.	14	1.93	27			
	Dec.	21	1.24	26			
	Total	416	.79	329			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	22	1.14	25	Same as historical		
	Feb.	24	1.04	25			
	March	17	1.29	22			
	April	5	2.00	10			
	May	4	2.75	11			
	June	34	.85	29			
-1959	July	6	2.00	12			
	Aug.	4	2.75	11			
	Sept.	4	2.50	10			
	Oct.	11	1.54	17			
	Nov.	13	1.54	20			
	Dec.	22	1.32	29			
	Total	166	1.33	221			
	Jan.	23	.87	20			
	Feb.	23	.83	19			
	March	27	1.15	31			
	April	8	1.62	13			
	May	18	1.17	21			
	June	23	.91	21			
-1960	July	1	4.00	4			
	Aug.	1	4.00	4			
	Sept.	1	4.00	4			
	Oct.	5	2.40	12			
	Nov.	12	1.58	19			
	Dec.	18	1.33	24			
	Total	160	1.20	192			
	Jan.	21	1.19	25			
	Feb.	19	1.47	28			
	March	10	1.50	15			
	April	2	3.50	7			
	May	3	2.33	7			
	June	3	2.67	8			
-1961	July	1	4.00	4			
	Aug.	1	3.00	3			
	Sept.	13	1.15	15			
	Oct.	19	1.47	28			
	Nov.	27	1.11	30			
	Dec.	26	1.00	26			
	Total	145	1.35	196			
	Jan.	21	.81	17			
	Feb.	43	.93	40			
	March	49	1.04	51			
	April	70	.69	48			
	May	88	.64	56			
	June	146	.47	69			
-1962	July	27	1.04	28			
	Aug.	4	2.75	11			
	Sept.	4	2.50	10			
	Oct.	15	1.73	26			
	Nov.	15	1.60	24			
	Dec.	23	1.26	29			
	Total	505	.81	409			
	Jan.	18	1.17	21			
	Feb.	29	1.14	33			
	March	10	1.90	19			
	April	5	3.20	16			
	May	31	.97	30			
	June	50	.76	38			
-1963	July	3	2.67	8			
	Aug.	5	2.40	12			
	Sept.	14	1.64	23			
	Oct.	7	2.43	17			
	Nov.	16	1.62	26			
	Dec.	22	1.14	25			
	Total	210	1.28	268			
	Jan.	18	1.00	18			
	Feb.	18	.94	17			
	March	23	1.04	24			
	April	14	1.57	22			
	May	72	.68	49			
	June	122	.66	81			
-1964	July	29	.97	28			
	Aug.	6	2.17	13			
	Sept.	4	2.75	11			
	Oct.	5	2.80	14			
	Nov.	18	1.67	30			
	Dec.	27	1.26	34			
	Total	356	.96	341			

Table 3

Colorado River Basin

Flow and Quality of Water Data

Duchesne River near Randlett, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	27	1.00	27	Same as historical		
	Feb.	21	1.38	29			
	March	26	1.54	40			
	April	32	1.16	37			
	May	71	1.11	79			
	June	302	.49	148			
-1965	July	175	.51	89			
	Aug.	57	.96	55			
	Sept.	58	1.09	63			
	Oct.	47	1.15	54			
	Nov.	47	1.13	53			
	Dec.	42	1.12	47			
	Total	905	.80	721			
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
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	March						
	April						
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	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	39	0.90	35	Same as historical		
	Feb.	38	.74	28			
	March	47	1.02	48			
	April	35	1.20	42			
	May	58	1.07	62			
	June	16	1.81	29			
-1966	July	3	3.00	9			
	Aug.	3	3.00	9			
	Sept.	6	2.50	15			
	Oct.	11	2.36	26			
	Nov.	19	1.79	34			
	Dec.	31	1.35	42			
	Total	306	1.24	379			
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
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	Nov.						
	Dec.						
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	March						
	April						
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	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 3

Colorado River Basin
Flow and Quality of Water Data
Duchesne River near Randlett, Utah
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)
1941	694	0.75	523	646	0.81	522
1942	526	.88	463	491	.94	462
1943	460	.99	454	414	1.09	453
1944	698	.74	517	651	.79	516
1945	407	1.08	440	369	1.19	439
1946	324	1.16	375	287	1.30	374
1947	569	.86	489	521	.94	488
1948	298	1.14	339	267	1.25	335
1949	641	.78	497	592	.84	496
1950	574	.87	497	519	.95	495
1951	448	1.06	477	398	1.19	475
1952	1,035	.60	619	964	.64	617
1953	326	1.12	366	290	1.26	365
1954	188	1.48	278	188	1.48	278
1955	245	1.32	323	245	1.32	323
1956	303	1.07	325	303	1.07	325
1957	456	.94	429	456	.94	429
1958	416	.79	329	416	.79	329
1959	166	1.33	221	166	1.33	221
1960	160	1.20	192	160	1.20	192
1961	145	1.35	196	145	1.35	196
1962	505	.81	409	505	.81	409
1963	210	1.28	268	210	1.28	268
1964	356	.96	341	356	.96	341
1965	905	.80	721	905	.80	721
1966	306	1.24	379	306	1.24	379
Total	11,361		10,467	10,770		10,448
Average	437	0.92	403	414	0.97	402

Sampled quality record December 1950 to September 1951, November 1956 to December 1966; remainder by correlation.
Measured flow record October 1942 to December 1966; remainder by correlation.

Table 4

Colorado River Basin

Flow and Quality of Water Data

Green River near Ouray, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	93	0.95	88	92	0.96	88
	Feb.	111	.97	108	110	.98	108
	March	202	.90	182	199	.91	182
	April	316	.64	202	305	.66	202
	May	1,200	.42	500	1,165	.43	502
	June	1,140	.37	420	1,097	.38	422
	July	333	.58	195	306	.65	198
	Aug.	245	.98	240	228	1.07	244
	Sept.	158	.95	150	147	1.05	154
	Oct.	284	.93	265	281	.95	267
	Nov.	214	.85	182	214	.86	184
	Dec.	151	.92	139	151	.93	141
	Total	4,447	.60	2,671	4,295	.63	2,692
1942	Jan.	110	.88	97	109	.89	97
	Feb.	113	.91	103	112	.92	103
	March	247	.91	225	244	.92	225
	April	840	.58	483	830	.58	483
	May	1,030	.47	485	1,001	.49	487
	June	1,250	.34	420	1,213	.35	421
	July	395	.51	200	368	.55	203
	Aug.	138	.74	102	121	.88	106
	Sept.	82	.96	79	69	1.19	82
	Oct.	108	.99	107	105	1.04	109
	Nov.	113	1.09	123	113	1.11	125
	Dec.	109	1.10	120	110	1.11	122
	Total	4,535	.56	2,544	4,395	.58	2,563
1943	Jan.	98	1.09	107	97	1.10	107
	Feb.	119	.91	108	118	.92	108
	March	227	.81	183	224	.82	183
	April	573	.51	290	562	.52	290
	May	820	.34	275	788	.35	276
	June	1,090	.36	392	1,049	.37	393
	July	591	.38	223	564	.40	226
	Aug.	278	.76	210	260	.82	213
	Sept.	109	.84	92	96	.99	95
	Oct.	115	.96	111	112	1.01	113
	Nov.	132	1.00	132	132	1.01	134
	Dec.	105	1.04	109	106	1.05	111
	Total	4,257	.52	2,232	4,108	.55	2,249
1944	Jan.	79	1.05	83	78	1.06	83
	Feb.	101	1.03	104	100	1.04	104
	March	210	1.08	226	207	1.09	226
	April	535	.68	365	524	.70	365
	May	970	.39	380	937	.41	382
	June	1,390	.28	395	1,348	.29	396
	July	572	.39	222	544	.41	225
	Aug.	128	.63	80	110	.76	84
	Sept.	68	.78	53	54	1.04	56
	Oct.	107	.95	102	104	1.00	104
	Nov.	110	1.02	112	110	1.04	114
	Dec.	87	1.07	93	88	1.08	95
	Total	4,357	.51	2,215	4,204	.53	2,234
1945	Jan.	103	.95	98	102	.96	98
	Feb.	116	.95	110	115	.96	110
	March	171	.94	160	168	.95	160
	April	289	.74	215	279	.77	215
	May	952	.37	354	921	.39	355
	June	1,050	.34	360	1,012	.36	361
	July	675	.37	248	649	.39	251
	Aug.	320	.67	213	302	.72	216
	Sept.	159	.64	102	147	.71	105
	Oct.	150	.85	128	147	.88	130
	Nov.	139	.91	126	139	.92	128
	Dec.	108	.97	105	109	.98	107
	Total	4,232	.52	2,219	4,090	.55	2,236
1946	Jan.	112	.91	102	111	.92	102
	Feb.	110	.83	91	109	.83	91
	March	222	.83	185	219	.84	185
	April	535	.53	286	525	.54	286
	May	760	.38	292	728	.40	294
	June	772	.33	255	732	.35	256
	July	252	.44	110	224	.50	113
	Aug.	143	.74	106	125	.88	110
	Sept.	101	.82	83	90	.96	86
	Oct.	147	.83	122	145	.86	124
	Nov.	160	.90	144	160	.91	146
	Dec.	148	.85	126	149	.86	128
	Total	3,462	.55	1,902	3,317	.58	1,921
1947	Jan.	94	0.89	84	93	0.90	84
	Feb.	138	.79	109	137	.80	109
	March	403	.69	279	400	.70	279
	April	425	.54	228	414	.55	228
	May	1,439	.36	512	1,402	.37	513
	June	1,351	.36	480	1,304	.37	481
	July	644	.38	248	613	.41	251
	Aug.	336	.61	205	316	.66	208
	Sept.	159	.71	113	147	.79	116
	Oct.	171	.82	140	170	.84	142
	Nov.	163	.86	140	164	.87	142
	Dec.	151	.91	137	153	.91	139
	Total	5,474	.49	2,675	5,313	.51	2,692
1948	Jan.	130	.91	118	129	.91	118
	Feb.	139	.76	106	138	.77	106
	March	277	.83	230	274	.84	230
	April	544	.62	335	534	.63	335
	May	1,089	.34	370	1,061	.35	371
	June	939	.32	300	906	.33	301
	July	242	.53	128	221	.59	130
	Aug.	123	.65	80	108	.77	83
	Sept.	66	.79	52	55	1.00	55
	Oct.	90	.84	76	87	.90	78
	Nov.	96	.94	90	95	.97	92
	Dec.	93	1.04	97	92	1.06	98
	Total	3,828	.52	1,982	3,700	.54	1,997
1949	Jan.	97	.89	86	96	.90	86
	Feb.	104	.82	85	103	.83	85
	March	263	.78	205	260	.79	205
	April	490	.59	287	479	.60	287
	May	1,229	.38	470	1,190	.40	471
	June	1,548	.37	580	1,495	.39	580
	July	558	.48	270	524	.52	272
	Aug.	153	.70	108	136	.82	111
	Sept.	104	.77	80	92	.89	82
	Oct.	193	.85	165	193	.86	166
	Nov.	175	.89	155	177	.88	156
	Dec.	114	1.04	118	116	1.03	119
	Total	5,028	.52	2,609	4,861	.54	2,620
1950	Jan.	125	1.00	125	124	1.01	125
	Feb.	135	.85	115	134	.86	115
	March	321	.78	250	318	.79	250
	April	649	.50	325	637	.51	325
	May	1,069	.45	480	1,025	.47	480
	June	1,597	.33	520	1,539	.34	521
	July	711	.43	308	671	.46	310
	Aug.	226	.62	140	205	.70	143
	Sept.	145	.79	114	133	.88	117
	Oct.	144	.87	126	145	.88	127
	Nov.	165	.83	137	167	.83	138
	Dec.	159	.86	137	162	.85	138
	Total	5,446	.51	2,777	5,260	.53	2,789
1951	Jan.	108	.91	98	107	.92	98
	Feb.	164	.79	130	163	.80	130
	March	214	.79	170	211	.81	170
	April	394	.57	225	382	.59	225
	May	938	.41	385	900	.43	385
	June	1,299	.37	481	1,251	.39	482
	July	616	.40	250	586	.43	252
	Aug.	358	.61	220	340	.66	223
	Sept.	160	.65	104	150	.71	107
	Oct.	207	.82	170	205	.83	171
	Nov.	158	.87	137	159	.87	138
	Dec.	131	.92	120	132	.92	121
	Total	4,747	.52	2,490	4,586	.55	2,502
1952	Jan.	125	.90	112	124	.90	112
	Feb.	132	.86	114	131	.87	114
	March	151	.85	129	148	.87	129
	April	959	.68	652	946	.69	652
	May	1,888	.42	793	1,848	.43	793
	June	1,738	.34	590	1,688	.35	591
	July	477	.57	270	448	.61	272
	Aug.	294	.70	206	276	.76	209
	Sept.	166	.80	133	155	.88	136
	Oct.	117	.98	115	112	1.04	116
	Nov.	115	1.04	120	113	1.07	121
	Dec.	120	1.08	130	120	1.09	131
	Total	6,282	.54	3,364	6,109	.55	3,376

Table 4

Colorado River Basin

Flow and Quality of Water Data

Green River near Ouray, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	139	0.86	120	138	0.87	120
	Feb.	137	.88	120	136	.88	120
	March	215	.86	185	212	.87	185
	April	234	.79	185	223	.83	185
	May	501	.45	225	471	.48	226
	June	1,185	.33	390	1,145	.34	390
-1953	July	354	.42	150	327	.46	152
	Aug.	200	.68	137	184	.76	140
	Sept.	83	.78	65	73	.92	67
	Oct.	82	.95	78	79	1.00	79
	Nov.	118	.97	115	118	.98	116
	Dec.	105	1.00	105	106	1.00	106
	Total	3,353	.56	1,875	3,212	.59	1,886
	Jan.	105	.95	100	104	.96	100
	Feb.	139	.86	120	138	.87	120
	March	172	.84	145	169	.86	145
	April	291	.60	175	283	.62	175
	May	693	.32	220	673	.33	221
	June	373	.39	145	342	.43	146
-1954	July	348	.37	130	322	.41	132
	Aug.	122	.49	60	106	.59	63
	Sept.	117	.77	90	107	.86	92
	Oct.	127	.94	120	127	.95	121
	Nov.	116	.90	105	118	.90	106
	Dec.	76	1.12	85	77	1.12	86
	Total	2,679	.56	1,495	2,566	.59	1,507
	Jan.	78	.90	70	77	.91	70
	Feb.	83	.84	70	82	.85	70
	March	203	.91	185	200	.92	185
	April	319	.64	205	311	.66	205
	May	707	.34	240	687	.35	241
	June	676	.32	215	644	.33	215
-1955	July	214	.40	85	191	.46	87
	Aug.	151	.73	110	136	.83	113
	Sept.	68	.81	55	57	.98	56
	Oct.	75	.89	67	66	1.03	68
	Nov.	84	.96	81	86	.95	82
	Dec.	126	.87	110	127	.87	111
	Total	2,784	.54	1,493	2,664	.56	1,503
	Jan.	140	.86	120	139	.86	120
	Feb.	93	.97	90	92	.98	90
	March	330	.67	220	327	.67	220
	April	489	.45	220	481	.46	220
	May	1,040	.31	325	1,009	.32	326
	June	1,180	.30	355	1,128	.32	356
-1956	July	288	.42	120	264	.46	122
	Aug.	166	.60	100	150	.69	103
	Sept.	70	.61	43	60	.73	44
	Oct.	75	.80	60	78	.78	61
	Nov.	96	.92	88	101	.88	89
	Dec.	80	.95	76	84	.92	77
	Total	4,047	.45	1,817	3,913	.47	1,828
	Jan.	83	.88	73	82	.89	73
	Feb.	102	.90	92	101	.91	92
	March	230	.83	191	227	.84	191
	April	317	.66	209	309	.68	209
	May	987	.42	414	969	.43	414
	June	1,915	.31	590	1,890	.31	590
-1957	July	1,185	.30	360	1,162	.31	361
	Aug.	345	.61	210	330	.64	212
	Sept.	179	.70	125	169	.75	126
	Oct.	181	.79	143	179	.80	144
	Nov.	206	.83	171	207	.83	172
	Dec.	140	.84	118	140	1.01	142
	Total	5,870	.46	2,696	5,765	.47	2,726
	Jan.	122	.79	96	121	.79	96
	Feb.	178	.73	130	177	.73	130
	March	246	.79	194	243	.80	194
	April	422	.58	245	414	.59	245
	May	1,357	.33	450	1,341	.34	450
	June	1,115	.28	312	1,094	.29	312
-1958	July	189	.53	100	170	.59	101
	Aug.	99	.65	64	86	.77	66
	Sept.	83	.82	68	73	.95	69
	Oct.	85	.84	71	82	.87	71
	Nov.	99	.91	90	99	.91	90
	Dec.	110	.87	96	109	.88	96
	Total	4,105	.47	1,916	4,009	.48	1,920

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	100	0.90	90	99	0.91	90
	Feb.	117	.77	[illegible]	116	.78	90
	March	160	.82	[illegible]	157	.83	131
	April	235	.60	[illegible]	227	.62	141
	May	508	.36	[illegible]	494	.37	183
	June	813	.31	[illegible]	794	.32	251
-1959	July	316	.46	145	299	.48	144
	Aug.	169	.69	117	157	.75	117
	Sept.	101	.79	80	92	.87	80
	Oct.	170	.71	121	166	.73	121
	Nov.	145	.72	104	144	.72	104
	Dec.	103	.88	91	102	.89	91
	Total	2,937	.53	1,545	2,847	.54	1,543
	Jan.	87	.86	75	86	.87	75
	Feb.	86	.93	80	85	.94	80
	March	345	.73	252	342	.74	252
	April	576	.42	242	568	.43	242
	May	575	.36	207	561	.37	207
	June	729	.30	219	710	.31	218
-1960	July	165	.50	82	148	.55	81
	Aug.	71	.68	48	59	.81	48
	Sept.	62	.73	45	53	.85	45
	Oct.	94	.80	75	90	.83	75
	Nov.	109	.75	82	108	.76	82
	Dec.	76	.88	67	75	.89	67
	Total	2,975	.50	1,474	2,885	.51	1,472
	Jan.	76	.78	59	75	.79	59
	Feb.	93	.74	69	92	.75	69
	March	151	.78	118	148	.80	118
	April	184	.67	123	176	.70	123
	May	387	.37	143	373	.38	143
	June	575	.29	167	556	.30	166
-1961	July	112	.46	52	95	.54	51
	Aug.	73	.77	56	61	.92	56
	Sept.	158	.81	128	149	.86	128
	Oct.	216	.67	145	212	.68	145
	Nov.	160	.72	115	159	.72	115
	Dec.	113	.85	95	112	.85	95
	Total	2,298	.55	1,270	2,208	.57	1,268
	Jan.	101	.74	75	100	.75	75
	Feb.	349	.69	240	348	.69	240
	March	434	.77	335	431	.78	335
	April	1,092	.47	510	1,084	.47	510
	May	1,362	.34	463	1,348	.34	463
	June	1,090	.30	327	1,071	.30	326
-1962	July	600	.40	240	583	.41	239
	Aug.	184	.55	101	172	.59	101
	Sept.	88	.80	70	79	.89	70
	Oct.	116	.92	107	112	.96	107
	Nov.	86	.97	83	85	.98	83
	Dec.	72	.97	70	71	.99	70
	Total	5,574	.47	2,621	5,484	.48	2,619
	Jan.	66	.89	59	65	.91	59
	Feb.	115	.81	93	114	.82	93
	March	94	.87	82	91	.90	82
	April	160	.55	88	154	.57	88
	May	431	.27	116	421	.28	116
	June	304	.36	109	290	.37	108
-1963	July	48	.83	40	36	1.08	39
	Aug.	59	1.37	81	51	1.59	81
	Sept.	73	1.15	84	66	1.27	84
	Oct.	45	1.11	50	42	1.19	50
	Nov.	75	.99	74	74	1.00	74
	Dec.	86	.81	70	85	.82	70
	Total	1,556	.61	946	1,489	.63	944
	Jan.	110	.69	77	110	.69	77
	Feb.	114	.70	80	114	.70	80
	March	124	.74	92	122	.75	92
	April	196	.73	143	192	.74	143
	May	663	.41	272	656	.41	272
	June	741	.36	267	733	.36	266
-1964	July	332	.50	166	326	.51	165
	Aug.	183	.76	139	180	.77	139
	Sept.	148	.73	108	146	.74	108
	Oct.	203	.74	150	202	.74	150
	Nov.	210	.77	162	210	.77	162
	Dec.	231	.77	178	231	.77	178
	Total	3,255	.56	1,834	3,222	.57	1,832

Table 4

Colorado River Basin

Flow and Quality of Water Data

Green River near Ouray, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	302	0.76	230	302	0.76	230
	Feb.	299	.78	233	299	.78	233
	March	357	.78	278	355	.78	278
	April	501	.68	341	498	.68	341
	May	812	.41	333	807	.41	333
	June	1,249	.35	437	1,244	.35	437
-1965	July	497	.47	234	494	.47	234
	Aug.	200	.74	148	199	.74	148
	Sept.	184	.82	151	183	.82	151
	Oct.	248	.76	188	248	.76	188
	Nov.	243	.78	190	243	.78	190
	Dec.	244	.77	188	244	.77	188
	Total	5,136	.57	2,951	5,116	.58	2,951
	Jan.						
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	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	177	0.77	136	177	0.77	136
	Feb.	162	.77	125	162	.77	125
	March	361	.67	242	361	.67	242
	April	388	.58	225	388	.58	225
	May	603	.39	235	603	.39	235
	June	325	.48	156	325	.48	156
-1966	July	146	.78	114	146	.78	114
	Aug.	145	.85	123	145	.85	123
	Sept.	153	.86	132	153	.86	132
	Oct.	185	.89	165	185	.89	165
	Nov.	150	.93	140	150	.93	140
	Dec.	140	.96	135	140	.96	135
	Total	2,935	.66	1,928	2,935	.66	1,928
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	Nov.						
	Dec.						
	Total						

Table 4
Colorado River Basin
Flow and Quality of Water Data
Green River near Ouray, Utah
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	4,447	0.60	2,671	4,295	0.63	2,692
1942	4,535	.56	2,544	4,395	.58	2,563
1943	4,257	.52	2,232	4,108	.55	2,249
1944	4,357	.51	2,215	4,204	.53	2,234
1945	4,232	.52	2,219	4,090	.55	2,236
1946	3,462	.55	1,902	3,317	.58	1,921
1947	5,474	.49	2,675	5,313	.51	2,692
1948	3,828	.52	1,982	3,700	.54	1,997
1949	5,028	.52	2,609	4,861	.54	2,620
1950	5,446	.51	2,777	5,260	.53	2,789
1951	4,747	.52	2,490	4,586	.55	2,502
1952	6,282	.54	3,364	6,109	.55	3,376
1953	3,353	.56	1,875	3,212	.59	1,886
1954	2,679	.56	1,495	2,566	.59	1,507
1955	2,784	.54	1,493	2,664	.56	1,503
1956	4,047	.45	1,817	3,913	.47	1,828
1957	5,870	.46	2,696	5,765	.47	2,726
1958	4,105	.47	1,916	4,009	.48	1,920
1959	2,937	.53	1,545	2,847	.54	1,543
1960	2,975	.50	1,474	2,885	.51	1,472
1961	2,298	.55	1,270	2,208	.57	1,268
1962	5,574	.47	2,621	5,484	.48	2,619
1963	1,556	.61	946	1,489	.63	944
1964	3,255	.56	1,834	3,222	.57	1,832
1965	5,136	.57	2,951	5,116	.58	2,951
1966	2,935	.66	1,928	2,935	.66	1,928
Total	105,599		55,541	102,553		55,798
Average	4,062	0.53	2,136	3,944	0.54	2,146

Sampled quality record December 1950 to September 1952, November 1956 to December 1959, March 1960 to September 1966; remainder by correlation.

Measured flow record October 1947 to September 1955, October 1956 to September 1966; remainder by correlation.

Table 5

Colorado River Basin

Flow and Quality of Water Data

Green River at Green River, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	100	1.01	101	101	1.02	103
	Feb.	126	1.06	134	126	1.07	135
	March	216	1.01	218	213	1.02	218
	April	314	.75	235	303	.78	235
	May	1,172	.53	621	1,126	.56	625
	June	1,146	.49	562	1,093	.52	568
- 1941	July	359	.63	226	322	.73	235
	Aug.	267	1.09	292	242	1.25	303
	Sept.	182	1.01	184	167	1.16	194
	Oct.	318	1.00	318	320	1.02	325
	Nov.	240	.90	216	244	.91	221
	Dec.	168	.98	165	170	.99	169
	Total	4,608	.71	3,272	4,427	.75	3,331
	Jan.	112	1.04	117	112	1.05	118
	Feb.	122	.98	120	122	.99	121
	March	264	.94	248	261	.95	248
	April	858	.65	557	848	.66	557
	May	980	.57	558	941	.60	562
	June	1,271	.39	495	1,224	.41	500
- 1942	July	414	.57	236	379	.65	245
	Aug.	152	.85	129	129	1.08	139
	Sept.	91	1.10	100	75	1.44	108
	Oct.	118	1.20	142	119	1.24	148
	Nov.	124	1.18	146	127	1.19	151
	Dec.	116	1.22	141	119	1.22	145
	Total	4,622	.65	2,989	4,456	.68	3,042
	Jan.	112	1.13	127	112	1.14	128
	Feb.	130	1.02	132	130	1.02	133
	March	236	.91	215	233	.92	215
	April	569	.57	325	558	.58	325
	May	763	.39	298	724	.41	300
	June	1,074	.40	430	1,025	.42	434
- 1943	July	612	.43	263	578	.47	270
	Aug.	300	.83	249	277	.93	257
	Sept.	116	.98	114	101	1.20	121
	Oct.	124	1.10	136	124	1.14	141
	Nov.	146	1.04	152	148	1.05	156
	Dec.	112	1.11	124	115	1.11	128
	Total	4,294	.60	2,565	4,125	.63	2,608
	Jan.	80	1.20	96	81	1.21	98
	Feb.	111	1.06	118	111	1.07	119
	March	252	1.07	270	249	1.08	270
	April	529	.81	428	518	.83	428
	May	924	.48	444	880	.51	448
	June	1,391	.30	417	1,339	.31	422
- 1944	July	591	.44	260	553	.49	269
	Aug.	143	.73	104	117	.98	115
	Sept.	73	.96	70	55	1.44	79
	Oct.	115	1.13	130	117	1.17	137
	Nov.	119	1.14	136	123	1.13	141
	Dec.	88	1.23	108	91	1.23	112
	Total	4,416	.58	2,581	4,234	.62	2,638
	Jan.	109	1.04	113	109	1.05	114
	Feb.	128	.99	127	128	1.00	128
	March	185	1.03	191	182	1.05	191
	April	291	.84	244	281	.87	244
	May	909	.44	400	870	.46	402
	June	1,016	.39	396	970	.41	400
- 1945	July	701	.41	287	668	.44	295
	Aug.	335	.74	248	312	.82	256
	Sept.	163	.77	125	148	.89	132
	Oct.	161	.99	159	161	1.02	165
	Nov.	149	.99	148	152	1.00	152
	Dec.	113	1.06	120	116	1.07	124
	Total	4,260	.60	2,558	4,097	.64	2,603
	Jan.	123	.95	117	123	.96	118
	Feb.	117	.91	106	117	.91	107
	March	236	.90	212	233	.91	212
	April	528	.60	317	518	.61	317
	May	775	.41	318	736	.44	321
	June	746	.36	269	697	.39	274
1946	July	264	.47	124	228	.58	132
	Aug.	152	.84	128	129	1.06	137
	Sept.	105	.91	96	91	1.14	104
	Oct.	149	1.00	149	150	1.03	155
	Nov.	170	.98	167	173	.99	171
	Dec.	154	.94	145	157	.95	149
	Total	3,519	.61	2,148	3,352	.66	2,197
	Jan.	92	1.07	98	92	1.08	99
	Feb.	151	.86	130	151	.87	131
	March	411	.79	325	408	.80	325
	April	422	.59	249	411	.61	249
	May	1,400	.38	532	1,356	.39	534
	June	1,348	.39	526	1,294	.41	530
- 1947	July	656	.40	262	618	.44	269
	Aug.	365	.71	259	340	.79	267
	Sept.	166	.77	128	152	.89	135
	Oct.	181	.91	165	183	.93	170
	Nov.	179	.91	163	182	.92	167
	Dec.	152	1.01	154	156	1.01	158
	Total	5,523	.54	2,991	5,343	.57	3,034
	Jan.	141	.94	132	141	.94	133
	Feb.	137	.91	124	137	.90	124
	March	313	.86	270	310	.87	270
	April	558	.69	385	548	.70	385
	May	1,061	.39	414	1,029	.40	416
	June	952	.34	324	914	.36	327
- 1948	July	268	.54	145	243	.62	150
	Aug.	137	.81	111	118	.99	117
	Sept.	69	.81	56	56	1.11	62
	Oct.	92	1.02	94	91	1.08	98
	Nov.	104	1.05	109	104	1.09	113
	Dec.	97	1.10	107	97	1.12	109
	Total	3,929	.58	2,271	3,788	.61	2,304
	Jan.	100	1.01	101	99	1.02	101
	Feb.	110	.92	101	109	.93	101
	March	276	.92	254	273	.93	254
	April	474	.69	327	463	.71	327
	May	1,221	.43	525	1,179	.45	526
	June	1,547	.42	650	1,491	.44	651
- 1949	July	592	.57	338	555	.62	342
	Aug.	172	.77	132	154	.89	137
	Sept.	112	.89	100	99	1.05	104
	Oct.	207	.98	203	208	.99	205
	Nov.	190	.90	171	193	.90	173
	Dec.	128	1.07	137	131	1.06	139
	Total	5,129	.59	3,039	4,954	.62	3,060
	Jan.	141	1.01	142	141	1.01	143
	Feb.	147	1.01	148	146	1.01	148
	March	356	.90	321	353	.91	321
	April	620	.64	397	608	.65	397
	May	1,026	.53	544	979	.56	545
	June	1,567	.35	548	1,506	.37	551
- 1950	July	734	.49	360	690	.53	364
	Aug.	246	.63	155	222	.72	160
	Sept.	149	.89	133	135	1.02	138
	Oct.	153	.96	147	156	.96	150
	Nov.	166	.99	164	169	.98	166
	Dec.	171	.96	164	175	.95	166
	Total	5,476	.59	3,223	5,280	.62	3,249
	Jan.	113	1.13	128	113	1.14	129
	Feb.	167	.92	154	166	.93	154
	March	205	.93	190	202	.94	190
	April	372	.70	260	360	.72	260
	May	882	.45	397	841	.47	398
	June	1,309	.40	524	1,258	.42	527
- 1951	July	627	.43	270	593	.46	274
	Aug.	379	.69	261	358	.74	266
	Sept.	178	.79	140	166	.87	145
	Oct.	211	.99	210	211	1.01	213
	Nov.	164	1.05	172	166	1.05	174
	Dec.	132	1.07	142	134	1.07	144
	Total	4,739	.60	2,848	4,568	.63	2,874
	Jan.	134	1.01	136	133	1.02	136
	Feb.	140	.96	135	139	.97	135
	March	160	1.05	168	157	1.07	168
	April	988	.88	869	975	.89	869
	May	2,087	.48	1,002	2,044	.49	1,002
	June	1,809	.36	651	1,756	.37	653
- 1952	July	514	.60	309	482	.65	313
	Aug.	315	.89	280	296	.96	285
	Sept.	184	.96	177	172	1.06	182
	Oct.	129	1.09	140	125	1.14	142
	Nov.	122	1.24	151	121	1.26	153
	Dec.	129	1.20	155	130	1.21	157
	Total	6,711	.62	4,173	6,530	.64	4,195

Table 5

Colorado River Basin

Flow and Quality of Water Data

Green River at Green River, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	140	1.05	147	139	1.06	147
	Feb.	141	1.04	147	140	1.05	147
	March	217	1.00	217	214	1.01	217
	April	221	.96	212	210	1.01	212
	May	454	.55	250	421	.60	251
	June	1,167	.37	432	1,124	.39	433
-1953	July	376	.48	181	346	.53	185
	Aug.	212	.84	178	195	.94	183
	Sept.	87	.99	86	76	1.18	90
	Oct.	86	1.20	104	84	1.26	106
	Nov.	125	1.15	144	126	1.16	146
	Dec.	107	1.18	126	109	1.17	128
	Total	3,333	.67	2,224	3,184	.70	2,245
	Jan.	107	1.09	117	106	1.10	117
	Feb.	138	1.03	142	137	1.04	142
	March	169	1.03	174	166	1.05	174
	April	270	.75	202	262	.77	202
	May	640	.38	243	617	.40	244
	June	376	.45	169	342	.50	171
-1954	July	346	.46	159	317	.51	163
	Aug.	120	.65	78	103	.81	83
	Sept.	134	1.02	137	123	1.15	141
	Oct.	139	1.14	159	140	1.15	161
	Nov.	120	1.06	127	123	1.05	129
	Dec.	80	1.25	100	82	1.24	102
	Total	2,639	.68	1,807	2,518	.73	1,829
	Jan.	80	1.06	85	79	1.08	85
	Feb.	86	.92	79	85	.93	79
	March	237	.92	218	234	.93	218
	April	311	.77	239	303	.79	239
	May	[illegible]	.39	264	655	.40	265
	June	654	.36	236	620	.38	237
-1955	July	223	.46	102	198	.53	105
	Aug.	161	.83	134	145	.95	138
	Sept.	71	.93	66	60	1.13	68
	Oct.	77	1.08	83	77	1.10	85
	Nov.	86	1.13	97	89	1.11	99
	Dec.	127	1.02	130	128	1.02	131
	Total	2,790	.62	1,733	2,673	.65	1,749
	Jan.	155	.91	141	154	.92	141
	Feb.	100	1.05	105	99	1.06	105
	March	314	.81	255	311	.82	255
	April	460	.53	244	452	.54	244
	May	995	.35	348	964	.36	349
	June	1,207	.32	386	1,154	.34	387
-1956	July	294	.49	144	269	.55	147
	Aug.	169	.67	113	154	.76	117
	Sept.	72	.72	52	62	.85	53
	Oct.	77	.94	73	80	.92	74
	Nov.	99	1.02	101	104	.98	102
	Dec.	79	1.05	83	83	1.01	84
	Total	4,021	.51	2,045	3,886	.53	2,058
	Jan.	83	.95	79	83	.96	80
	Feb.	100	.94	94	99	.95	94
	March	237	.89	210	234	.90	210
	April	290	.73	212	282	.75	212
	May	913	.48	438	892	.49	439
	June	1,871	.34	636	1,843	.35	638
-1957	July	1,164	.34	396	1,137	.35	399
	Aug.	386	.79	305	368	.84	309
	Sept.	202	.76	153	190	.82	156
	Oct.	185	.94	174	185	.96	177
	Nov.	228	.96	219	230	.96	221
	Dec.	149	.97	144	150	.97	146
	Total	5,808	.53	3,060	5,693	.54	3,081
	Jan.	128	.93	119	127	.94	119
	Feb.	183	.86	158	182	.87	158
	March	246	.92	227	243	.93	227
	April	432	.71	307	424	.72	307
	May	1,311	.41	537	1,292	.42	537
	June	1,174	.35	411	1,150	.36	412
-1958	July	224	.62	139	203	.70	142
	Aug.	110	.82	91	95	1.00	95
	Sept.	96	1.07	103	86	1.23	106
	Oct.	91	1.01	92	89	1.04	93
	Nov.	102	1.10	113	103	1.11	114
	Dec.	114	1.09	124	114	1.10	125
	Total	4,211	.57	2,421	4,108	.59	2,435
	Jan.	97	1.13	110	96	1.15	110
	Feb.	114	.95	108	113	.96	108
	March	146	.94	137	143	.96	137
	April	219	.76	166	211	.79	166
	May	480	.42	202	466	.43	202
	June	763	.34	259	744	.35	258
-1959	July	346	.51	176	329	.53	175
	Aug.	180	.90	162	168	.96	162
	Sept.	104	.92	96	95	1.01	96
	Oct.	178	.86	153	174	.88	153
	Nov.	152	.83	126	151	.83	126
	Dec.	106	1.02	108	105	1.03	108
	Total	2,885	.62	1,803	2,795	.64	1,801
	Jan.	95	1.05	100	94	1.06	100
	Feb.	102	.95	97	101	.96	97
	March	320	.83	266	317	.84	266
	April	534	.51	272	526	.52	272
	May	551	.39	215	537	.40	215
	June	682	.33	225	663	.34	224
-1960	July	170	.52	88	153	.57	87
	Aug.	69	.76	52	57	.91	52
	Sept.	59	.93	55	50	1.10	55
	Oct.	96	1.00	96	92	1.04	96
	Nov.	105	.90	94	104	.90	94
	Dec.	80	1.06	85	79	1.08	85
	Total	2,863	.57	1,645	2,773	.59	1,643
	Jan.	79	.98	77	78	.99	77
	Feb.	94	.87	82	93	.88	82
	March	136	.89	121	133	.91	121
	April	184	.79	145	176	.82	145
	May	342	.41	140	328	.43	140
	June	542	.31	168	523	.32	167
-1961	July	112	.49	55	95	.57	54
	Aug.	80	.91	73	68	1.07	73
	Sept.	175	.99	173	166	1.04	173
	Oct.	234	.75	176	230	.76	176
	Nov.	161	.80	129	160	.81	129
	Dec.	126	.88	111	125	.89	111
	Total	2,265	.64	1,450	2,175	.67	1,448
	Jan.	114	.79	90	113	.80	90
	Feb.	403	.72	290	402	.72	290
	March	401	.95	381	398	.96	381
	April	1,093	.56	612	1,085	.56	612
	May	1,350	.36	486	1,336	.36	486
	June	1,074	.38	408	1,055	.39	407
-1962	July	598	.41	245	581	.42	244
	Aug.	176	.61	107	164	.65	107
	Sept.	98	.98	96	89	1.08	96
	Oct.	126	1.37	173	122	1.42	173
	Nov.	94	1.14	108	93	1.16	108
	Dec.	72	1.10	79	71	1.11	79
	Total	5,599	.55	3,075	5,509	.56	3,073
	Jan.	71	1.04	74	70	1.06	74
	Feb.	120	.93	112	119	.94	112
	March	99	1.00	99	96	1.03	99
	April	154	.68	105	148	.71	105
	May	399	.40	160	389	.41	160
	June	310	.42	130	296	.44	129
-1963	July	51	.76	39	39	.97	38
	Aug.	72	1.76	127	64	1.98	127
	Sept.	95	1.57	149	88	1.69	149
	Oct.	47	1.32	62	44	1.41	62
	Nov.	74	1.26	93	73	1.27	93
	Dec.	84	1.08	91	83	1.10	91
	Total	1,576	.79	1,241	1,509	.82	1,239
	Jan.	109	.76	83	109	.76	83
	Feb.	114	.76	87	114	.76	87
	March	128	.87	111	126	.88	111
	April	190	.89	169	185	.91	169
	May	634	.45	285	627	.45	285
	June	725	.40	290	717	.40	289
-1964	July	344	.54	186	338	.55	185
	Aug.	196	.93	182	194	.94	182
	Sept.	140	.82	115	138	.83	115
	Oct.	196	.78	153	195	.78	153
	Nov.	200	.84	168	200	.84	168
	Dec.	267	.81	216	267	.81	216
	Total	3,243	.63	2,045	3,210	.64	2,043

Table 5

Colorado River Basin

Flow and Quality of Water Data

Green River at Green River, Utah

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	300	0.73	219	300	0.73	219
	Feb.	303	.82	248	303	.82	248
	March	361	.88	318	359	.89	318
	April	518	.79	409	515	.79	409
	May	819	.46	377	814	.46	377
	June	1,207	.42	507	1,202	.42	507
-1965	July	546	.52	284	543	.52	284
	Aug.	228	.94	214	227	.94	214
	Sept.	189	.95	180	188	.96	180
	Oct.	253	.85	215	253	.85	215
	Nov.	239	.92	220	239	.92	220
	Dec.	248	.89	221	248	.89	221
	Total	5,211	.65	3,412	5,191	.66	3,412
	Jan.						
	Feb.						
	March						
	April						
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	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	181	0.86	156	181	0.86	156
	Feb.	166	.80	133	166	.80	133
	March	393	.80	314	393	.80	314
	April	390	.66	257	390	.66	257
	May	566	.48	272	566	.48	272
	June	325	.55	179	325	.55	179
-1966	July	146	.85	124	146	.85	124
	Aug.	146	.96	140	146	.96	140
	Sept.	157	1.01	159	157	1.01	159
	Oct.	193	1.02	197	193	1.02	197
	Nov.	158	1.06	167	158	1.06	167
	Dec.	148	1.12	166	148	1.12	166
	Total	2,969	.76	2,264	2,969	.76	2,264
	Jan.						
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	March						
	April						
	May						
	June						
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	Dec.						
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	Dec.						
	Total						
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	March						
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	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 5

Colorado River Basin
Flow and Quality of Water Data
Green River at Green River, Utah
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	4,608	0.71	3,272	4,427	0.75	3,331
1942	4,622	.65	2,989	4,456	.68	3,042
1943	4,294	.60	2,565	4,125	.63	2,608
1944	4,416	.58	2,581	4,234	.62	2,638
1945	4,260	.60	2,558	4,097	.64	2,603
1946	3,519	.61	2,148	3,352	.66	2,197
1947	5,523	.54	2,991	5,343	.57	3,034
1948	3,929	.58	2,271	3,788	.61	2,304
1949	5,129	.59	3,039	4,954	.62	3,060
1950	5,476	.59	3,223	5,280	.62	3,249
1951	4,739	.60	2,848	4,568	.63	2,874
1952	6,711	.62	4,173	6,530	.64	4,195
1953	3,333	.67	2,224	3,184	.70	2,245
1954	2,639	.68	1,807	2,518	.73	1,829
1955	2,790	.62	1,733	2,673	.65	1,749
1956	4,021	.51	2,045	3,886	.53	2,058
1957	5,808	.53	3,060	5,693	.54	3,081
1958	4,211	.57	2,421	4,108	.59	2,435
1959	2,885	.62	1,803	2,795	.64	1,801
1960	2,863	.57	1,645	2,773	.59	1,643
1961	2,265	.64	1,450	2,175	.67	1,448
1962	5,599	.55	3,075	5,509	.56	3,073
1963	1,576	.79	1,241	1,509	.82	1,239
1964	3,243	.63	2,045	3,210	.64	2,043
1965	5,211	.65	3,412	5,191	.66	3,412
1966	2,969	.76	2,264	2,969	.76	2,264
Total	106,639		64,883	103,347		65,455
Average	4,102	0.61	2,495	3,975	0.63	2,518

Sampled quality record entire period.
Measured flow record entire period.

Table 6

Colorado River Basin

Flow and Quality of Water Data

San Rafael River near Green River, Utah

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
					Same as Historical		
1941	Jan.	2	4.0	8			
	Feb.	2	4.0	8			
	March	6	3.5	21			
	April	1	4.0	4			
	May	50	1.2	62			
	June	49	1.2	59			
	July	7	2.9	20			
	Aug.	6	3.3	20			
	Sept.	2	4.5	9			
	Oct.	5	4.0	20			
	Nov.	5	4.2	21			
	Dec.	4	4.0	16			
	Total	139	1.9	268			
1942	Jan.	6	2.8	17			
	Feb.	5	3.6	18			
	March	6	3.7	22			
	April	14	2.8	39			
	May	34	1.4	49			
	June	51	1.2	61			
	July	6	3.0	18			
	Aug.	6	3.2	19			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	3	4.7	14			
	Dec.	3	4.7	14			
	Total	137	2.1	286			
1943	Jan.	4	3.0	12			
	Feb.	5	3.4	17			
	March	6	3.8	23			
	April	15	2.9	44			
	May	13	2.1	27			
	June	14	2.0	28			
	July	2	3.5	7			
	Aug.	6	3.2	19			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	2	5.0	10			
	Dec.	3	3.7	11			
	Total	73	2.9	213			
1944	Jan.	2	3.5	7			
	Feb.	3	3.0	9			
	March	6	3.5	21			
	April	1	5.0	5			
	May	40	1.3	53			
	June	72	1.1	78			
	July	9	2.9	26			
	Aug.	7	3.1	22			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	3	4.7	14			
	Dec.	3	4.3	13			
	Total	149	1.8	263			
1945	Jan.	3	3.3	10			
	Feb.	3	4.0	12			
	March	6	3.5	21			
	April	1	6.0	6			
	May	22	1.6	35			
	June	27	1.5	41			
	July	6	3.2	19			
	Aug.	7	3.4	24			
	Sept.	2	4.0	8			
	Oct.	3	5.0	15			
	Nov.	3	4.7	14			
	Dec.	2	4.5	9			
	Total	85	2.5	214			
1946	Jan.	2	4.0	8			
	Feb.	4	3.3	13			
	March	6	3.7	22			
	April	11	3.2	35			
	May	20	1.8	36			
	June	8	2.4	19			
	July	1	4.0	4			
	Aug.	7	5.4	38			
	Sept.	0	0	0			
	Oct.	2	5.0	10			
	Nov.	5	3.8	19			
	Dec.	3	4.3	13			
	Total	69	3.2	218			
1947	Jan.	2	4.5	[illegible]			
	Feb.	5	3.0	[illegible]			
	March	4	3.8	[illegible]			
	April	3	4.3	[illegible]			
	May	33	1.4	[illegible]			
	June	26	1.8	[illegible]			
	July	5	3.6	[illegible]			
	Aug.	20	3.4	68			
	Sept.	3	5.0	15			
	Oct.	2	6.0	12			
	Nov.	4	3.8	15			
	Dec.	4	3.5	14			
	Total	111	2.6	287			
1948	Jan.	3	3.7	11			
	Feb.	6	3.0	18			
	March	7	3.6	25			
	April	4	3.5	14			
	May	16	1.4	23			
	June	13	2.2	29			
	July	2	4.0	8			
	Aug.	6	2.2	13			
	Sept.	0	0	0			
	Oct.	1	5.0	5			
	Nov.	2	5.0	10			
	Dec.	2	4.5	9			
	Total	62	2.7	165			
1949	Jan.	2	4.0	8			
	Feb.	2	4.0	8			
	March	9	3.3	30			
	April	10	2.2	22			
	May	30	1.3	38			
	June	52	1.2	64			
	July	14	2.7	38			
	Aug.	5	3.0	15			
	Sept.	3	4.7	14			
	Oct.	3	4.7	14			
	Nov.	3	4.7	14			
	Dec.	2	4.5	9			
	Total	135	2.0	274			
1950	Jan.	2	4.5	9			
	Feb.	6	3.3	20			
	March	5	4.0	20			
	April	3	4.7	14			
	May	9	2.2	20			
	June	11	2.2	24			
	July	9	2.9	26			
	Aug.	1	3.0	3			
	Sept.	1	5.0	5			
	Oct.	1	6.0	6			
	Nov.	2	5.5	11			
	Dec.	3	4.3	13			
	Total	53	3.2	171			
1951	Jan.	2	5.0	10			
	Feb.	3	3.7	11			
	March	2	5.0	10			
	April	1	6.0	6			
	May	15	1.9	29			
	June	23	1.7	40			
	July	3	3.7	11			
	Aug.	12	2.2	27			
	Sept.	1	5.0	5			
	Oct.	6	4.0	24			
	Nov.	4	4.5	18			
	Dec.	3	5.0	15			
	Total	75	2.8	207			
1952	Jan.	3	3.7	11			
	Feb.	5	3.6	18			
	March	14	3.1	44			
	April	24	2.4	58			
	May	93	.8	78			
	June	128	.9	114			
	July	19	1.9	36			
	Aug.	12	3.3	40			
	Sept.	5	3.8	19			
	Oct.	3	4.7	14			
	Nov.	4	4.5	18			
	Dec.	4	4.0	16			
	Total	314	1.5	467			

Table 6

Colorado River Basin

Flow and Quality of Water Data

San Rafael River near Green River, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	6	2.8	17		Same as Historical	
	Feb.	7	3.1	22			
	March	6	3.2	19			
	April	3	4.3	13			
	May	2	5.5	11			
	June	31	1.3	47			
-1953	July	5	3.8	19			
	Aug.	9	3.7	33			
	Sept.	1	5.0	5			
	Oct.	4	4.3	17			
	Nov.	4	4.5	18			
	Dec.	3	4.8	14			
	Total	81	2.9	235			
	Jan.	3	4.0	12			
	Feb.	5	3.8	19			
	March	4	3.8	15			
	April	3	4.3	13			
	May	8	2.9	23			
	June	1	5.0	5			
-1954	July	1	5.0	5			
	Aug.	1	3.0	3			
	Sept.	4	4.0	16			
	Oct.	2	4.0	8			
	Nov.	2	4.5	9			
	Dec.	2	4.5	9			
	Total	36	3.8	137			
	Jan.	2	4.0	8			
	Feb.	2	3.5	7			
	March	6	3.5	21			
	April	3	3.7	11			
	May	4	3.0	12			
	June	6	2.8	17			
-1955	July	0	0	0			
	Aug.	3	3.7	11			
	Sept.	0	0	0			
	Oct.	0	0	0			
	Nov.	1	5.0	5			
	Dec.	2	4.5	9			
	Total	29	3.5	101			
	Jan.	3	3.7	11			
	Feb.	3	3.3	10			
	March	3	3.3	10			
	April	1	5.0	5			
	May	11	1.6	18			
	June	8	2.0	16			
-1956	July	1	4.0	4			
	Aug.	1	3.0	3			
	Sept.	0	0	0			
	Oct.	0	0	0			
	Nov.	1	5.0	5			
	Dec.	1	5.0	5			
	Total	33	2.6	87			
	Jan.	2	3.0	6			
	Feb.	4	3.0	12			
	March	2	5.0	10			
	April	1	5.0	5			
	May	9	3.1	28			
	June	94	.8	79			
-1957	July	24	1.5	37			
	Aug.	13	2.8	36			
	Sept.	4	3.5	14			
	Oct.	10	3.3	33			
	Nov.	21	2.5	53			
	Dec.	5	3.4	17			
	Total	189	1.7	330			
	Jan.	5	2.6	13			
	Feb.	8	2.8	22			
	March	6	3.3	20			
	April	13	1.6	21			
	May	66	.9	60			
-1958	June	57	.8	47			
	July	2	4.0	8			
	Aug.	4	4.5	18			
	Sept.	4	4.3	17			
	Oct.	1	5.0	5			
	Nov.	2	4.0	8			
	Dec.	4	3.3	13			
	Total	172	1.5	252			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	3	3.3	10		Same as Historical	
	Feb.	4	3.0	12			
	March	3	4.0	12			
	April	2	3.5	7			
	May	1	5.0	5			
	June	2	4.0	8			
-1959	July	0	0	* 0			
	Aug.	1	3.0	3			
	Sept.	1	5.0	5			
	Oct.	1	4.0	4			
	Nov.	2	4.0	8			
	Dec.	1	7.0	7			
	Total	21	3.9	81			
	Jan.	1	6.0	6			
	Feb.	2	3.5	7			
	March	8	2.8	22			
	April	3	3.3	10			
	May	8	1.9	15			
	June	11	1.5	17			
-1960	July	0	0	* 0			
	Aug.	0	0	0			
	Sept.	1	4.0	4			
	Oct.	8	2.5	20			
	Nov.	2	4.5	9			
	Dec.	2	4.0	8			
	Total	46	2.6	118			
	Jan.	2	3.5	7			
	Feb.	3	2.7	8			
	March	2	5.5	11			
	April	2	4.0	8			
	May	3	3.0	9			
	June	2	2.5	5			
-1961	July	0	0	0			
	Aug.	7	2.9	20			
	Sept.	18	2.9	53			
	Oct.	3	4.0	12			
	Nov.	4	3.5	14			
	Dec.	2	4.5	9			
	Total	48	3.3	156			
	Jan.	2	4.0	8			
	Feb.	8	2.5	20			
	March	6	2.8	17			
	April	11	1.3	14			
	May	29	1.1	31			
	June	37	1.0	37			
-1962	July	7	2.6	18			
	Aug.	1	4.0	4			
	Sept.	3	3.0	9			
	Oct.	4	4.5	18			
	Nov.	2	5.5	11			
	Dec.	2	5.5	11			
	Total	112	1.8	198			
	Jan.	2	5.5	11			
	Feb.	4	3.2	13			
	March	2	5.5	11			
	April	1	6.0	6			
	May	6	2.3	14			
	June	10	2.2	22			
-1963	July	1	2.0	2			
	Aug.	9	3.8	34			
	Sept.	6	4.3	26			
	Oct.	1	6.0	6			
	Nov.	2	4.5	9			
	Dec.	2	4.5	9			
	Total	46	3.5	163			
	Jan.	1	6.0	6			
	Feb.	2	4.0	8			
	March	3	3.7	11			
	April	1	8.0	8			
	May	15	1.9	29			
	June	20	1.6	33			
-1964	July	4	3.8	15			
	Aug.	6	3.7	22			
	Sept.	1	4.0	4			
	Oct.	0	0	0			
	Nov.	1	7.0	7			
	Dec.	3	4.7	14			
	Total	57	2.7	157			

* Revised

Table 6

Colorado River Basin

Flow and Quality of Water Data

San Rafael River near Green River, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	4	3.5	14	Same as historical		
	Feb.	3	3.7	11			
	March	3	4.0	12			
	April	6	2.7	16			
	May	18	1.6	28			
	June	77	.9	70			
- 1965	July	38	1.6	60			
	Aug.	16	2.5	40			
	Sept.	5	4.0	20			
	Oct.	4	4.5	18			
	Nov.	5	4.8	24			
	Dec.	5	3.2	16			
	Total	184	1.8	329			
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	3	3.7	11	Same as historical		
	Feb.	3	3.7	11			
	March	8	3.5	[illegible]			
	April	4	3.0	12			
	May	4	4.5	[illegible]			
	June	2	4.0	[illegible]			
- 1966	July	2	4.5	9			
	Aug.	1	3.0	3			
	Sept.	2	5.0	10			
	Oct.	1	8.0	8			
	Nov.	1	5.0	5			
	Dec.	2	5.0	10			
	Total	33	4.0	133			
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 6
Colorado River Basin
Flow and Quality of Water Data
San Rafael River near Green River, Utah
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	139	1.93	268		Same as historical	
1942	137	2.09	286			
1943	73	2.92	213			
1944	149	1.76	263			
1945	85	2.52	214			
1946	69	3.16	218			
1947	1111	2.59	287			
1948	62	2.66	165			
1949	135	2.03	274			
1950	53	3.23	171			
1951	75	2.76	207			
1952	314	1.49	467			
1953	81	2.90	235			
1954	36	3.81	137			
1955	29	3.48	101			
1956	33	2.64	87			
1957	189	1.75	330			
1958	172	1.47	252			
1959	21	3.86	81			
1960	46	2.57	118			
1961	48	3.25	156			
1962	112	1.77	198			
1963	46	3.54	163			
1964	57	2.75	157			
1965	184	1.79	329			
1966	33	4.03	133			
Total	2,489		5,510			
Average	96	2.21	212			

Sampled quality record November 1946 to September 1949, November 1950 to December 1966, remainder by correlation.
Measured flow record October 1945 to December 1966, remainder by correlation.

Table 7

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Glenwood Springs, Colorado

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
-1941	Jan.	36	0.75	27	22	1.18	26
	Feb.	37	.59	22	23	.91	21
	March	50	.60	30	32	.91	29
	April	85	.47	40	71	.55	39
	May	534	.22	115	495	.23	113
	June	470	.19	90	377	.23	85
	July	163	.37	60	95	.60	57
	Aug.	84	.60	50	48	1.00	48
	Sept.	67	.60	40	49	.80	39
	Oct.	78	.58	45	64	.69	44
	Nov.	59	.63	37	45	.80	36
	Dec.	48	.67	32	34	.91	31
	Total	1,711	.34	588	1,355	.42	568
-1942	Jan.	43	.74	32	25	1.24	31
	Feb.	41	.68	28	23	1.17	27
	March	46	.70	32	23	1.35	31
	April	167	.42	70	149	.46	69
	May	389	.24	93	339	.27	91
	June	722	.16	116	603	.18	110
	July	230	.27	62	144	.40	58
	Aug.	78	.53	41	33	1.18	39
	Sept.	46	.78	36	23	1.52	35
	Oct.	53	.75	40	35	1.11	39
	Nov.	49	.76	37	31	1.16	36
	Dec.	40	.82	33	22	1.45	32
	Total	1,904	.33	620	1,450	.41	598
-1943	Jan.	37	.86	32	23	1.35	31
	Feb.	36	.78	28	22	1.23	27
	March	48	.75	36	31	1.13	35
	April	162	.34	55	148	.36	54
	May	342	.23	79	304	.25	77
	June	582	.18	105	490	.20	100
	July	254	.28	71	188	.36	68
	Aug.	108	.45	49	73	.64	47
	Sept.	66	.64	42	49	.84	41
	Oct.	60	.67	40	46	.85	39
	Nov.	67	.54	36	53	.66	35
	Dec.	64	.53	34	50	.66	33
	Total	1,826	.33	607	1,477	.40	587
-1944	Jan.	37	.76	28	24	1.12	27
	Feb.	44	.66	29	31	.90	28
	March	50	.72	36	34	1.03	35
	April	85	.51	43	72	.58	42
	May	302	.26	78	269	.28	76
	June	498	.16	80	417	.18	76
	July	185	.29	54	126	.40	51
	Aug.	72	.49	35	41	.80	33
	Sept.	45	.71	32	29	1.07	31
	Oct.	60	.65	39	47	.81	38
	Nov.	57	.63	36	44	.80	35
	Dec.	59	.56	33	46	.70	32
	Total	1,494	.35	523	1,180	.43	504
-1945	Jan.	41	.71	29	27	1.04	28
	Feb.	37	.68	25	23	1.04	24
	March	62	.50	31	45	.67	30
	April	72	.51	37	58	.62	36
	May	347	.22	76	310	.24	74
	June	461	.18	83	371	.21	79
	July	268	.26	70	203	.33	67
	Aug.	180	.33	60	145	.40	58
	Sept.	73	.52	38	56	.66	37
	Oct.	78	.49	38	64	.58	37
	Nov.	73	.47	34	59	.56	33
	Dec.	71	.45	32	57	.54	31
	Total	1,763	.31	553	1,418	.38	534
-1946	Jan.	67	.48	32	56	.55	31
	Feb.	54	.54	29	43	.65	28
	March	64	.55	35	50	.68	34
	April	198	.28	55	187	.29	54
	May	284	.22	62	254	.24	60
	June	362	.22	80	292	.26	76
	July	164	.40	65	112	.55	62
	Aug.	83	.51	42	56	.73	41
	Sept.	59	.66	39	46	.83	38
	Oct.	70	.61	43	59	.71	42
	Nov.	61	.59	36	50	.70	35
	Dec.	77	.40	31	66	.45	30
	Total	1,543	.36	549	1,271	.42	531

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
-1947	Jan.	52	0.60	31	~~33~~	0.91	30
	Feb.	54	.61	33	~~35~~	.91	32
	March	68	.53	36	~~44~~	.80	35
	April	123	.37	46	~~104~~	.43	45
	May	486	.19	92	~~433~~	.21	89
	June	606	.17	103	~~480~~	.20	97
	July	438	.21	92	~~346~~	.25	87
	Aug.	147	.38	56	99	.55	54
	Sept.	79	.53	42	55	.75	41
	Oct.	89	.47	42	70	.59	41
	Nov.	80	.49	39	61	.62	38
	Dec.	75	.48	36	56	.62	35
	Total	2,297	.28	648	1,816	.34	624
-1948	Jan.	76	.45	34	62	.53	33
	Feb.	72	.44	32	58	.53	31
	March	68	.50	34	50	.66	33
	April	162	.37	60	148	.40	59
	May	542	.20	108	503	.21	106
	June	470	.18	85	378	.21	80
	July	156	.35	55	88	.59	52
	Aug.	90	.51	46	55	.80	44
	Sept.	57	.67	38	39	.95	37
	Oct.	63	.65	41	49	.82	40
	Nov.	66	.53	35	52	.65	34
	Dec.	59	.61	36	45	.78	35
	Total	1,881	.32	604	1,527	.38	584
-1949	Jan.	67	.54	36	50	.70	35
	Feb.	56	.57	32	39	.79	31
	March	58	.59	34	37	.89	33
	April	132	.38	50	115	.43	49
	May	364	.23	84	317	.26	82
	June	654	.19	124	543	.22	118
	July	356	.24	85	275	.29	81
	Aug.	106	.45	48	63	.73	46
	Sept.	69	.59	41	48	.83	40
	Oct.	61	.70	43	44	.95	42
	Nov.	55	.71	39	38	1.00	38
	Dec.	58	.62	36	41	.85	35
	Total	2,036	.32	652	1,610	.39	630
-1950	Jan.	56	.63	35	52	.67	35
	Feb.	54	.56	30	50	.60	30
	March	80	.44	35	75	.47	35
	April	141	.35	49	137	.36	49
	May	259	.26	67	247	.27	66
	June	429	.20	86	401	.21	85
	July	137	.42	58	116	.49	57
	Aug.	80	.50	40	69	.57	39
	Sept.	66	.58	38	61	.62	38
	Oct.	49	.80	39	45	.87	39
	Nov.	53	.70	37	49	.76	37
	Dec.	56	.61	34	52	.65	34
	Total	1,460	.38	548	1,354	.40	544
-1951	Jan.	59	.56	33	54	.61	33
	Feb.	58	.52	30	53	.57	30
	March	58	.55	32	51	.63	32
	April	104	.40	42	99	.42	42
	May	381	.23	88	366	.24	87
	June	536	.20	107	499	.21	105
	July	285	.25	71	258	.27	70
	Aug.	132	.43	57	118	.47	56
	Sept.	77	.58	45	70	.64	45
	Oct.	75	.61	46	70	.66	46
	Nov.	63	.57	36	58	.62	36
	Dec.	63	.51	32	58	.55	32
	Total	1,891	.33	619	1,754	.35	614
-1952	Jan.	53	.60	32	44	.73	32
	Feb.	47	.62	29	38	.76	29
	March	63	.51	32	52	.60	31
	April	194	.38	74	185	.40	74
	May	597	.23	137	573	.24	136
	June	785	.19	149	728	.20	146
	July	245	.34	83	205	.40	81
	Aug.	157	.51	80	136	.58	79
	Sept.	99	.54	53	88	.59	52
	Oct.	77	.58	45	68	.66	45
	Nov.	66	.64	42	57	.74	42
	Dec.	60	.58	35	51	.69	35
	Total	2,443	.32	791	2,225	.35	782

Table 7

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Glenwood Springs, Colorado

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	64	0.59	38	60	0.63	38
	Feb.	53	.57	30	49	.61	30
	March	68	.54	37	63	.59	37
	April	103	.46	47	99	.47	47
	May	229	.32	73	219	.33	72
	June	509	.20	102	485	.21	101
	July	171	.41	70	154	.45	69
	Aug.	121	.50	60	112	.54	60
	Sept.	69	.58	40	64	.62	40
	Oct.	64	.63	40	61	.66	40
	Nov.	55	.75	41	52	.79	41
	Dec.	58	.66	38	55	.69	38
	Total	1,564	.39	616	1,473	.42	613
1954	Jan.	62	.58	36	60	.60	36
	Feb.	48	.62	30	46	.65	30
	March	62	.58	36	60	.60	36
	April	86	.44	38	84	.45	38
	May	146	.35	51	142	.36	51
	June	89	.52	46	80	.58	46
	July	83	.55	46	77	.60	46
	Aug.	74	.58	43	70	.61	43
	Sept.	59	.61	36	57	.63	36
	Oct.	58	.66	38	56	.68	38
	Nov.	48	.71	34	46	.74	34
	Dec.	40	.90	36	38	.95	36
	Total	855	.55	470	816	.58	470
1955	Jan.	38	.79	30	36	.83	30
	Feb.	34	.82	28	32	.87	28
	March	43	.79	34	41	.83	34
	April	90	.48	43	88	.49	43
	May	206	.28	58	200	.29	58
	June	217	.31	67	204	.32	66
	July	100	.56	56	90	.61	55
	Aug.	86	.66	57	81	.70	57
	Sept.	67	.57	38	65	.58	38
	Oct.	61	.62	38	59	.64	38
	Nov.	55	.69	38	53	.72	38
	Dec.	55	.60	33	53	.62	33
	Total	1,052	.49	520	1,002	.52	518
1956	Jan.	52	.60	31	50	.62	31
	Feb.	48	.56	27	46	.59	27
	March	69	.59	41	67	.61	41
	April	120	.44	53	118	.45	53
	May	422	.26	110	416	.26	110
	June	330	.24	79	317	.25	78
	July	104	.54	56	95	.59	56
	Aug.	82	.61	50	77	.65	50
	Sept.	73	.55	40	71	.56	40
	Oct.	66	.55	36	64	.56	36
	Nov.	50	.72	36	48	.75	36
	Dec.	41	.78	32	39	.82	32
	Total	1,457	.41	591	1,408	.42	590
1957	Jan.	46	.72	33	44	.75	33
	Feb.	44	.68	30	42	.71	30
	March	51	.67	34	49	.69	34
	April	92	.53	49	90	.54	49
	May	350	.32	112	346	.32	112
	June	834	.21	175	825	.21	175
	July	571	.22	126	564	.22	126
	Aug.	176	.37	65	172	.38	65
	Sept.	88	.56	49	86	.57	49
	Oct.	75	.60	45	73	.62	45
	Nov.	72	.58	42	70	.60	42
	Dec.	63	.59	37	61	.61	37
	Total	2,462	.32	797	2,422	.33	797
1958	Jan.	62	.55	34	61	.56	34
	Feb.	58	.50	29	57	.51	29
	March	73	.52	38	71	.54	38
	April	102	.45	46	101	.46	46
	May	546	.22	120	543	.22	120
	June	439	.21	92	431	.21	92
	July	104	.51	53	98	.54	53
	Aug.	67	.60	40	64	.62	40
	Sept.	62	.58	36	60	.60	36
	Oct.	58	.64	37	57	.65	37
	Nov.	54	.69	37	53	.70	37
	Dec.	54	.63	34	53	.64	34
	Total	1,679	.35	596	1,649	.36	596

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	62	0.55	34	Same as historical		
	Feb.	54	.52	28			
	March	49	.65	32			
	April	81	.54	44			
	May	252	.29	73			
	June	342	.25	85			
	July	126	.48	61			
	Aug.	89	.61	54			
	Sept.	73	.56	41			
	Oct.	84	.55	46			
	Nov.	69	.55	38			
	Dec.	59	.53	31			
	Total	1,340	.42	567			
1960	Jan.	67	.49	33			
	Feb.	55	.51	28			
	March	93	.47	44			
	April	166	.32	53			
	May	288	.25	72			
	June	357	.25	89			
	July	122	.49	60			
	Aug.	73	.60	44			
	Sept.	67	.60	40			
	Oct.	61	.62	38			
	Nov.	56	.61	34			
	Dec.	61	.54	33			
	Total	1,466	.39	568			
1961	Jan.	65	.52	34			
	Feb.	56	.54	30			
	March	54	.59	32			
	April	66	.55	36			
	May	207	.29	60			
	June	203	.28	57			
	July	82	.60	49			
	Aug.	80	.59	47			
	Sept.	109	.50	54			
	Oct.	128	.43	55			
	Nov.	81	.49	40			
	Dec.	77	.47	36			
	Total	1,208	.44	530			
1962	Jan.	80	.44	35			
	Feb.	91	.42	38			
	March	122	.39	48			
	April	347	.32	111			
	May	539	.23	125			
	June	455	.23	105			
	July	288	.29	84			
	Aug.	110	.50	55			
	Sept.	74	.58	43			
	Oct.	127	.42	53			
	Nov.	102	.47	48			
	Dec.	72	.57	41			
	Total	2,407	.33	786			
1963	Jan.	55	.67	37			
	Feb.	53	.62	33			
	March	62	.58	36			
	April	81	.48	39			
	May	175	.31	54			
	June	122	.45	55			
	July	66	.67	44			
	Aug.	77	.60	46			
	Sept.	76	.57	43			
	Oct.	63	.60	38			
	Nov.	54	.67	36			
	Dec.	38	.82	31			
	Total	922	.53	492			
1964	Jan.	36	.81	29			
	Feb.	33	.79	26			
	March	40	.70	28			
	April	64	.45	39			
	May	210	.32	67			
	June	215	.31	67			
	July	99	.63	62			
	Aug.	87	.61	53			
	Sept.	72	.60	43			
	Oct.	65	.65	42			
	Nov.	50	.72	36			
	Dec.	51	.73	37			
	Total	1,022	.52	529			

Table 7

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Glenwood Springs, Colorado

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	51	0.71	36	Same as historical		
	Feb.	44	.73	32			
	March	49	.69	34			
	April	104	.50	52			
	May	263	.30	79			
	June	446	.26	116			
- 1965	July	271	.31	84			
	Aug.	172	.39	67			
	Sept.	95	.51	48			
	Oct.	95	.44	42			
	Nov.	85	.46	39			
	Dec.	88	.47	41			
	Total	1,763	.38	670			
	Jan.	78	0.47	37	Same as historical		
	Feb.	70	.46	32			
	March	91	.46	42			
	April	84	.46	39			
	May	186	.30	56			
	June	110	.45	50			
- 1966	July	89	.51	45			
	Aug.	77	.45	35			
	Sept.	68	.51	35			
	Oct.	72	.60	43			
	Nov.	55	.65	36			
	Dec.	44	.75	33			
	Total	1,024	.47	483			
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 7
Colorado River Basin
Flow and Quality of Water Data
Colorado River near Glenwood Springs, Colorado
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	1,711	0.34	588	1,355	0.42	568
1942	1,904	.33	620	1,450	.41	598
1943	1,826	.33	607	1,477	.40	587
1944	1,494	.35	523	1,180	.43	504
1945	1,763	.31	553	1,418	.38	534
1946	1,543	.36	549	1,271	.42	531
1947	2,297	.28	648	1,816	.34	624
1948	1,881	.32	604	1,527	.38	584
1949	2,036	.32	652	1,610	.39	630
1950	1,460	.38	548	1,354	.40	544
1951	1,891	.33	619	1,754	.35	614
1952	2,443	.32	791	2,225	.35	782
1953	1,564	.39	616	1,473	.42	613
1954	855	.55	470	816	.58	470
1955	1,052	.49	520	1,002	.52	518
1956	1,457	.41	591	1,408	.42	590
1957	2,462	.32	797	2,422	.33	797
1958	1,679	.35	596	1,649	.36	596
1959	1,340	.42	567	1,340	.42	567
1960	1,466	.39	568	1,466	.39	568
1961	1,208	.44	530	1,208	.44	530
1962	2,407	.33	786	2,407	.33	786
1963	922	.53	492	922	.53	492
1964	1,022	.52	529	1,022	.52	529
1965	1,763	.38	670	1,763	.38	670
1966	1,024	.47	483	1,024	.47	483
Total	42,470		15,517	38,359		15,309
Average	1,633	0.37	597	1,475	0.40	589

Sampled quality record October 1941 to December 1966; remainder by correlation.
Measured flow record entire period.

Table 8

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cameo, Colorado

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	65	1.23	80	51	1.55	79
	Feb.	67	1.15	77	53	1.43	76
	March	82	1.11	91	64	1.41	90
	April	133	.83	111	119	.92	110
	May	948	.34	322	909	.35	320
	June	803	.28	225	710	.31	220
-1941	July	315	.47	148	247	.59	145
	Aug.	144	.91	131	108	1.19	129
	Sept.	122	.97	118	104	1.12	117
	Oct.	166	.88	146	152	.95	145
	Nov.	124	.96	119	110	1.07	118
	Dec.	104	1.11	115	90	1.27	114
	Total	3,073	.55	1,683	2,717	.61	1,663
	Jan.	90	1.24	112	72	1.54	111
	Feb.	86	1.19	102	68	1.48	101
	March	103	1.13	116	80	1.43	115
	April	334	.62	207	316	.65	206
	May	757	.41	311	707	.44	309
	June	1,215	.24	292	1,096	.26	286
-1942	July	407	.44	179	321	.54	175
	Aug.	139	.85	118	94	1.23	116
	Sept.	86	1.15	99	63	1.55	98
	Oct.	94	1.18	111	76	1.44	110
	Nov.	94	1.24	117	76	1.52	116
	Dec.	84	1.26	106	66	1.59	105
	Total	3,489	.54	1,870	3,035	.61	1,848
	Jan.	77	1.30	100	63	1.57	99
	Feb.	74	1.26	93	60	1.53	92
	March	89	1.22	109	72	1.50	108
	April	237	.56	133	223	.59	132
	May	509	.32	163	471	.34	161
	June	931	.23	214	839	.25	209
-1943	July	387	.39	151	321	.46	148
	Aug.	192	.73	140	157	.88	138
	Sept.	117	.89	104	100	1.03	103
	Oct.	111	1.00	111	97	1.13	110
	Nov.	115	.90	103	101	1.01	102
	Dec.	107	.93	100	93	1.06	99
	Total	2,946	.52	1,521	2,597	.58	1,501
	Jan.	74	1.24	92	61	1.49	91
	Feb.	76	1.11	84	63	1.32	83
	March	81	1.11	90	65	1.37	89
	April	118	.85	100	105	.94	99
	May	564	.36	203	531	.38	201
	June	890	.24	214	809	.26	210
-1944	July	378	.38	143	319	.44	140
	Aug.	123	.80	98	92	1.04	96
	Sept.	78	1.09	85	62	1.35	84
	Oct.	99	1.05	104	86	1.19	103
	Nov.	100	1.01	101	87	1.14	100
	Dec.	99	1.02	101	86	1.16	100
	Total	2,680	.53	1,415	2,366	.59	1,396
	Jan.	78	1.15	90	64	1.39	89
	Feb.	72	1.18	85	58	1.45	84
	March	95	.99	94	78	1.19	93
	April	115	.90	104	101	1.02	103
	May	601	.36	216	564	.38	214
	June	795	.27	215	705	.30	211
-1945	July	499	.33	165	434	.37	162
	Aug.	287	.52	149	252	.58	147
	Sept.	118	.83	98	101	.96	97
	Oct.	126	.79	100	112	.88	99
	Nov.	125	.81	101	111	.90	100
	Dec.	117	.89	104	103	1.00	103
	Total	3,028	.50	1,521	2,683	.56	1,502
	Jan.	109	.90	98	98	.99	97
	Feb.	91	.97	88	80	1.09	87
	March	99	.94	93	85	1.08	92
	April	285	.45	128	274	.46	127
	May	449	.32	144	419	.34	142
	June	689	.28	193	619	.30	189
-1946	July	267	.51	136	215	.62	133
	Aug.	126	.85	107	99	1.07	106
	Sept.	92	1.01	93	79	1.16	92
	Oct.	122	.89	109	111	.97	108
	Nov.	104	.92	96	93	1.02	95
	Dec.	121	.82	99	110	.89	98
	Total	2,554	.54	1,384	2,282	.60	1,366
	Jan.	82	1.04	85	63	1.33	84
	Feb.	82	.99	[illegible]	63	1.27	80
	March	107	.96	103	83	1.22	102
	April	178	.63	112	159	.70	111
	May	809	.28	227	756	.30	224
	June	1,027	.25	[illegible]	901	.28	251
-1947	July	733	.27	198	641	.30	193
	Aug.	240	.58	139	192	.71	137
	Sept.	143	.78	111	119	.92	110
	Oct.	153	.80	122	134	.90	121
	Nov.	135	.77	104	116	.89	103
	Dec.	118	.86	102	99	1.02	101
	Total	3,807	.43	1,641	3,326	.49	1,617
	Jan.	116	.84	97	102	.94	96
	Feb.	111	.81	90	97	.92	89
	March	115	.90	104	97	1.06	103
	April	252	.59	149	238	.62	148
	May	920	.30	276	881	.31	274
	June	844	.26	219	752	.28	214
-1948	July	312	.47	146	244	.59	143
	Aug.	161	.77	124	126	.97	122
	Sept.	88	1.03	91	70	1.28	90
	Oct.	109	1.02	111	95	1.16	110
	Nov.	107	.96	103	93	1.10	102
	Dec.	90	1.04	94	76	1.22	93
	Total	3,225	.50	1,604	2,871	.55	1,584
	Jan.	99	.96	95	82	1.15	94
	Feb.	84	.92	77	67	1.13	76
	March	98	.98	96	77	1.23	95
	April	201	.65	131	184	.71	130
	May	572	.36	206	525	.39	204
	June	1,080	.26	281	969	.28	275
-1949	July	594	.34	202	513	.39	198
	Aug.	184	.69	127	141	.89	125
	Sept.	122	.93	113	101	1.11	112
	Oct.	125	.98	123	108	1.13	122
	Nov.	108	1.01	109	91	1.19	108
	Dec.	101	1.05	106	84	1.25	105
	Total	3,368	.49	1,666	2,942	.56	1,644
	Jan.	91	1.04	95	87	1.09	95
	Feb.	88	.95	84	84	1.00	84
	March	118	.87	103	113	.91	103
	April	212	.59	125	208	.60	125
	May	418	.40	167	406	.41	166
	June	787	.27	212	759	.28	211
-1950	July	273	.54	147	252	.58	146
	Aug.	124	.87	108	113	.95	107
	Sept.	111	.97	108	106	1.02	108
	Oct.	97	1.19	115	93	1.23	115
	Nov.	98	1.14	112	94	1.19	112
	Dec.	98	1.07	105	94	1.11	105
	Total	2,515	.59	1,481	2,409	.61	1,477
	Jan.	96	1.01	97	91	1.06	97
	Feb.	88	.95	84	83	1.01	84
	March	99	1.01	100	92	1.08	100
	April	151	.70	106	146	.73	106
	May	536	.34	182	521	.35	181
	June	857	.27	232	820	.28	230
-1951	July	471	.36	170	444	.38	169
	Aug.	207	.68	141	193	.72	140
	Sept.	111	.90	100	104	.96	100
	Oct.	120	.92	110	115	.96	110
	Nov.	104	.97	101	99	1.02	101
	Dec.	106	.96	102	101	1.01	102
	Total	2,946	.52	1,525	2,809	.54	1,520
	Jan.	96	1.01	97	87	1.11	97
	Feb.	84	1.06	89	75	1.19	89
	March	113	.99	112	102	1.09	111
	April	313	.60	188	304	.62	188
	May	978	.36	352	954	.37	351
	June	1,320	.26	343	1,263	.27	340
-1952	July	449	.44	197	409	.48	195
	Aug.	276	.70	193	255	.75	192
	Sept.	171	.78	133	160	.82	132
	Oct.	123	.97	119	114	1.04	119
	Nov.	112	1.04	117	103	1.14	117
	Dec.	99	1.12	111	90	1.23	111
	Total	4,134	.50	2,051	3,916	.52	2,042

Table 8

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cameo, Colorado

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	99	1.03	102	95	1.07	102
	Feb.	80	1.06	85	76	1.12	85
	March	102	.96	98	97	1.01	98
	April	136	.78	106	132	.80	106
	May	346	.44	152	336	.45	151
	June	886	.27	239	862	.28	238
	July	294	.52	154	277	.55	153
	Aug.	194	.72	140	185	.76	140
	Sept.	101	.99	100	96	1.04	100
	Oct.	101	1.06	107	98	1.09	107
	Nov.	99	1.13	112	96	1.16	112
	Dec.	92	1.17	108	89	1.21	108
	Total	2,530	.59	1,503	2,439	.62	1,500
1954	Jan.	95	1.00	95	93	1.02	95
	Feb.	81	1.05	85	79	1.07	85
	March	94	1.01	95	92	1.03	95
	April	136	.78	106	134	.79	106
	May	296	.48	142	292	.49	142
	June	204	.60	123	195	.63	123
	July	146	.81	118	140	.84	118
	Aug.	105	.97	102	101	1.01	102
	Sept.	103	1.07	110	101	1.09	110
	Oct.	125	.97	121	123	.98	121
	Nov.	98	1.07	105	96	1.09	105
	Dec.	82	1.23	101	80	1.26	101
	Total	1,565	.83	1,303	1,526	.85	1,303
1955	Jan.	74	1.23	91	72	1.26	91
	Feb.	67	1.25	84	65	1.29	84
	March	86	1.13	97	84	1.15	97
	April	142	.77	110	140	.78	110
	May	384	.42	161	378	.42	161
	June	448	.37	166	435	.38	165
	July	214	.61	130	204	.63	129
	Aug.	157	.87	137	152	.90	137
	Sept.	100	.94	94	98	.96	94
	Oct.	91	1.02	93	89	1.04	93
	Nov.	94	1.06	100	92	1.08	100
	Dec.	89	1.07	95	87	1.09	95
	Total	1,946	.70	1,358	1,896	.72	1,356
1956	Jan.	81	1.07	87	79	1.10	87
	Feb.	75	1.11	83	73	1.14	83
	March	104	.98	102	102	1.00	102
	April	184	.66	122	182	.67	122
	May	685	.34	233	679	.34	233
	June	637	.31	197	624	.31	196
	July	173	.70	121	164	.74	121
	Aug.	115	.95	109	110	.99	109
	Sept.	88	.90	79	86	.92	79
	Oct.	93	.95	88	91	.97	88
	Nov.	84	1.07	90	82	1.10	90
	Dec.	73	1.21	88	71	1.24	88
	Total	2,392	.59	1,399	2,343	.60	1,398
1957	Jan.	80	1.10	88	78	1.13	88
	Feb.	77	1.10	85	75	1.13	85
	March	83	1.16	96	81	1.18	96
	April	151	.83	125	149	.84	125
	May	591	.47	278	587	.47	278
	June	1,415	.27	382	1,406	.27	382
	July	1,072	.27	289	1,065	.27	289
	Aug.	338	.50	169	334	.50	169
	Sept.	157	.78	123	155	.79	123
	Oct.	136	.89	121	134	.90	121
	Nov.	123	.91	112	121	.92	112
	Dec.	102	.96	98	100	.98	98
	Total	4,325	.45	1,966	4,285	.46	1,966
1958	Jan.	92	.93	86	91	.94	86
	Feb.	95	.93	88	94	.94	88
	March	123	.89	110	121	.91	110
	April	172	.76	130	171	.76	130
	May	847	.31	263	844	.31	263
	June	808	.27	218	800	.27	218
	July	193	.67	129	187	.69	129
	Aug.	109	.97	106	106	1.00	106
	Sept.	103	1.03	106	101	1.05	106
	Oct.	100	1.09	109	99	1.10	109
	Nov.	94	1.09	102	93	1.09	102
	Dec.	86	1.12	96	85	1.13	96
	Total	2,822	.55	1,543	2,792	.55	1,543

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
						Same as historical	
1959	Jan.	94	1.02	96			
	Feb.	86	1.01	87			
	March	82	1.09	89			
	April	118	.83	98			
	May	392	.40	157			
	June	684	.29	198			
	July	215	.59	127			
	Aug.	131	.87	114			
	Sept.	105	.98	103			
	Oct.	138	.81	112			
	Nov.	116	.87	101			
	Dec.	100	.98	98			
	Total	2,261	.61	1,380			
1960	Jan.	100	.89	89			
	Feb.	92	.95	87			
	March	135	.78	105			
	April	246	.51	125			
	May	432	.37	160			
	June	668	.30	200			
	July	217	.60	130			
	Aug.	117	.89	104			
	Sept.	102	.95	97			
	Oct.	106	1.00	106			
	Nov.	99	1.05	104			
	Dec.	100	1.01	101			
	Total	2,414	.58	1,408			
1961	Jan.	99	.97	96			
	Feb.	85	.94	80			
	March	86	1.06	91			
	April	103	.91	94			
	May	355	.40	142			
	June	426	.34	145			
	July	138	.81	112			
	Aug.	115	.89	102			
	Sept.	175	.73	128			
	Oct.	200	.59	118			
	Nov.	131	.73	96			
	Dec.	121	.78	94			
	Total	2,034	.64	1,298			
1962	Jan.	115	.78	90			
	Feb.	135	.74	100			
	March	160	.69	110			
	April	513	.40	205			
	May	893	.31	277			
	June	882	.27	238			
	July	545	.37	202			
	Aug.	186	.72	134			
	Sept.	121	.95	115			
	Oct.	173	.74	128			
	Nov.	148	.79	117			
	Dec.	115	.99	114			
	Total	3,986	.46	1,830			
1963	Jan.	95	1.10	105			
	Feb.	87	.98	85			
	March	98	1.02	100			
	April	127	.79	100			
	May	322	.40	129			
	June	246	.53	130			
	July	111	.91	101			
	Aug.	115	.92	106			
	Sept.	112	.89	100			
	Oct.	96	.99	95			
	Nov.	90	1.09	98			
	Dec.	71	1.32	94			
	Total	1,570	.79	1,243			
1964	Jan.	58	1.29	75			
	Feb.	55	1.18	65			
	March	67	1.13	76			
	April	105	.92	97			
	May	403	.41	165			
	June	465	.35	163			
	July	223	.62	138			
	Aug.	153	.81	124			
	Sept.	116	.86	100			
	Oct.	104	1.01	105			
	Nov.	94	1.11	104			
	Dec.	91	1.08	98			
	Total	1,934	.68	1,310			

Table 8

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cameo, Colorado

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	92	1.10	101		Same as historical	
	Feb.	78	1.09	85			
	March	85	1.15	98			
	April	161	.69	111			
	May	477	.39	186			
	June	920	.28	258			
-1965	July	605	.34	206			
	Aug.	273	.56	153			
	Sept.	172	.75	129			
	Oct.	167	.75	125			
	Nov.	137	.75	103			
	Dec.	138	.75	103			
	Total	3,305	:50	1,658			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	114	0.82	93		Same as historical	
	Feb.	99	.81	80			
	March	133	.77	102			
	April	141	.66	93			
	May	373	.40	[illegible]			
	June	277	.48	[illegible]			
-1966	July	157	.73	[illegible]			
	Aug.	119	.87	104			
	Sept.	101	.94	95			
	Oct.	108	.98	106			
	Nov.	93	1.05	98			
	Dec.	85	1.22	104			
	Total	1,800	.71	1,272			

Table 8

Colorado River Basin
Flow and Quality of Water Data
Colorado River near Cameo, Colorado
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)
1941	3,073	0.55	1,683	2,717	0.61	1,663
1942	3,489	.54	1,870	3,035	.61	1,848
1943	2,946	.52	1,521	2,597	.58	1,501
1944	2,680	.53	1,415	2,366	.59	1,396
1945	3,028	.50	1,521	2,683	.56	1,502
1946	2,554	.54	1,384	2,282	.60	1,366
1947	3,807	.43	1,641	3,326	.49	1,617
1948	3,225	.50	1,604	2,871	.55	1,584
1949	3,368	.49	1,666	2,942	.56	1,644
1950	2,515	.59	1,481	2,409	.61	1,477
1951	2,946	.52	1,525	2,809	.54	1,520
1952	4,134	.50	2,051	3,916	.52	2,042
1953	2,530	.59	1,503	2,439	.62	1,500
1954	1,565	.83	1,303	1,526	.85	1,303
1955	1,946	.70	1,358	1,896	.72	1,356
1956	2,392	.59	1,399	2,343	.60	1,398
1957	4,325	.45	1.966	4,285	.46	1.966
1958	2,822	.55	1,543	2,792	.55	1,543
1959	2,261	.61	1,380	2,261	.61	1,380
1960	2,414	.58	1,408	2,414	.58	1,408
1961	2,034	.64	1,298	2,034	.64	1,298
1962	3,986	.46	1,830	3,986	.46	1,830
1963	1,570	.79	1,243	1,570	.79	1,243
1964	1,934	.68	1,310	1,934	.68	1,310
1965	3,305	.50	1,658	3,305	.50	1,658
1966	1,800	.71	1,272	1,800	.71	1,272
Total	72,649		39,833	68,538		39,625
Average	2,794	0.55	1,532	2,636	0.58	1,524

Sampled quality record entire period.
Measured flow record entire period.

Table 9

Colorado River Basin

Flow and Quality of Water Data

Gunnison River near Grand Junction, Colorado

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	51	1.90	97	52	1.88	98
	Feb.	50	1.82	93	51	1.84	94
	March	63	1.67	105	65	1.63	106
	April	123	1.00	123	125	1.00	125
	May	871	.40	349	861	.41	354
	June	563	.46	259	549	.48	264
- 1941	July	192	.94	180	178	1.04	186
	Aug.	95	1.41	134	84	1.65	139
	Sept.	81	2.11	171	73	2.40	175
	Oct.	198	1.35	267	201	1.34	270
	Nov.	121	1.33	161	123	1.32	163
	Dec.	84	1.58	133	86	1.55	134
	Total	2,492	.83	2,072	2,448	.86	2,108
	Jan.	71	1.59	113	72	1.58	114
	Feb.	62	1.66	103	63	1.65	104
	March	76	1.64	125	77	1.64	126
	April	546	.52	284	548	.52	286
	May	759	.47	357	750	.48	361
	June	688	.38	261	676	.39	266
- 1942	July	167	.93	156	154	1.05	161
	Aug.	68	2.18	148	58	2.62	152
	Sept.	56	2.36	132	49	2.72	136
	Oct.	57	2.58	147	60	2.48	149
	Nov.	65	1.92	125	67	1.89	127
	Dec.	58	1.83	106	59	1.81	107
	Total	2,673	.77	2,057	2,633	.79	2,089
	Jan.	57	1.72	98	58	1.71	99
	Feb.	48	1.60	77	49	1.59	78
	March	56	1.55	87	57	1.54	88
	April	280	.44	123	282	.44	124
	May	389	.48	187	381	.50	191
	June	397	.46	183	385	.49	187
- 1943	July	113	1.08	122	101	1.26	127
	Aug.	154	1.43	220	146	1.53	224
	Sept.	87	1.59	138	80	1.76	141
	Oct.	69	1.84	127	71	1.82	129
	Nov.	75	1.59	119	77	1.56	120
	Dec.	61	1.57	96	62	1.56	97
	Total	1,786	.88	1,577	1,749	.92	1,605
	Jan.	51	1.65	84	52	1.63	85
	Feb.	48	1.44	69	49	1.43	70
	March	53	1.42	75	54	1.41	76
	April	102	.97	99	104	.97	101
	May	758	.32	242	749	.33	246
	June	694	.33	229	682	.34	234
- 1944	July	230	.69	159	217	.76	164
	Aug.	51	1.94	99	41	2.51	103
	Sept.	45	2.44	110	38	3.00	114
	Oct.	58	2.31	134	61	2.23	136
	Nov.	71	1.86	132	73	1.84	134
	Dec.	64	1.73	111	65	1.72	112
	Total	2,225	.69	1,543	2,185	.72	1,575
	Jan.	55	1.58	87	56	1.57	88
	Feb.	47	1.62	76	48	1.60	77
	March	52	1.48	77	53	1.47	78
	April	91	1.00	91	93	.99	92
	May	628	.35	220	620	.36	224
	June	407	.46	187	395	.48	191
- 1945	July	164	.85	139	152	.95	144
	Aug.	122	1.22	149	114	1.34	153
	Sept.	46	2.39	110	39	2.90	113
	Oct.	76	2.00	152	78	1.97	154
	Nov.	73	1.63	119	75	1.60	120
	Dec.	58	1.59	92	59	1.58	93
	Total	1,819	.82	1,499	1,782	.86	1,527
	Jan.	58	1.55	90	59	1.54	91
	Feb.	48	1.44	69	49	1.43	70
	March	58	1.28	74	59	1.27	75
	April	182	.59	108	184	.59	109
	May	228	.59	135	219	.63	139
	June	321	.52	167	310	.55	171
- 1946	July	64	1.62	104	52	2.10	109
	Aug.	56	2.16	121	47	2.66	125
	Sept.	54	2.31	125	47	2.72	128
	Oct.	69	2.06	140	71	2.00	142
	Nov.	67	1.70	114	69	1.67	115
	Dec.	56	1.55	87	57	1.54	88
	Total	1,261	1.06	1,334	1,223	1.11	1,362
	Jan.	45	1.67	75	46	1.65	76
	Feb.	47	1.49	70	[illegible]	[illegible]	71
	March	55	1.27	70	56	1.27	71
	April	96	.82	79	97	.82	80
	May	455	.39	177	447	.40	180
	June	502	.46	231	491	.48	235
- 1947	July	242	.64	155	231	.69	160
	Aug.	120	1.50	180	112	1.63	183
	Sept.	95	1.63	155	89	1.78	158
	Oct.	114	1.60	183	116	1.59	185
	Nov.	96	1.35	130	97	1.35	131
	Dec.	70	1.41	99	71	1.41	100
	Total	1,937	.83	1,604	1,901	.86	1,630
	Jan.	58	1.38	80	59	1.37	81
	Feb.	65	1.43	93	66	1.42	94
	March	76	1.38	105	77	1.38	106
	April	324	.51	165	325	.51	166
	May	835	.30	251	827	.31	254
	June	546	.40	218	536	.41	221
- 1948	July	141	.92	129	130	1.02	[illegible]
	Aug.	71	1.84	131	63	2.13	[illegible]
	Sept.	49	2.25	110	44	2.57	[illegible]
	Oct.	57	2.09	119	59	2.05	[illegible]
	Nov.	70	1.84	129	71	1.83	[illegible]
	Dec.	70	1.64	115	71	1.63	[illegible]
	Total	2,362	.70	1,645	2,328	.72	[illegible]
	Jan.	51	1.49	76	51	1.49	76
	Feb.	52	1.48	77	52	1.48	77
	March	69	1.42	98	70	1.41	[illegible]
	April	235	.57	134	236	.57	[illegible]
	May	481	.38	183	475	.39	[illegible]
	June	651	.42	273	643	.43	[illegible]
- 1949	July	265	.65	172	256	.68	[illegible]
	Aug.	65	1.80	117	59	2.02	[illegible]
	Sept.	53	2.15	114	49	2.37	[illegible]
	Oct.	70	2.09	146	71	2.07	[illegible]
	Nov.	74	1.58	117	75	1.57	[illegible]
	Dec.	54	1.74	94	55	1.73	[illegible]
	Total	2,120	.76	1,601	2,092	.77	[illegible]
	Jan.	54	1.57	85	54	1.57	[illegible]
	Feb.	57	2.00	112	57	1.96	[illegible]
	March	60	1.33	80	61	1.33	[illegible]
	April	219	.50	110	220	.50	[illegible]
	May	309	.45	139	303	.47	[illegible]
	June	319	.50	160	311	.52	[illegible]
- 1950	July	88	1.43	126	79	1.65	[illegible]
	Aug.	37	2.16	80	30	2.73	[illegible]
	Sept.	46	2.61	120	41	2.98	122
	Oct.	37	2.65	98	38	2.61	99
	Nov.	49	2.12	104	50	2.10	105
	Dec.	60	1.73	104	61	1.72	105
	Total	1,335	.99	1,318	1,305	1.02	1,336
	Jan.	47	1.64	77	47	1.64	77
	Feb.	46	1.59	73	46	1.59	73
	March	55	1.27	70	55	1.29	71
	April	62	.97	60	63	.97	61
	May	265	.51	135	259	.53	137
	June	323	.52	168	315	.54	170
- 1951	July	93	1.06	99	85	1.20	102
	Aug.	53	1.72	91	46	2.02	93
	Sept.	37	2.30	85	33	2.64	87
	Oct.	49	2.41	118	50	2.38	119
	Nov.	60	1.88	113	61	1.87	114
	Dec.	46	1.65	76	47	1.64	77
	Total	1,136	1.03	1,165	1,107	1.07	1,181
	Jan.	53	1.53	81	53	1.53	81
	Feb.	48	1.48	71	48	1.48	71
	March	53	1.41	75	54	1.39	75
	April	342	.46	157	343	.46	158
	May	818	.33	270	812	.33	272
	June	759	.35	266	751	.36	268
- 1952	July	201	.79	158	193	.83	161
	Aug.	121	1.54	187	115	1.64	189
	Sept.	76	1.86	141	73	1.96	143
	Oct.	67	1.90	127	68	1.88	128
	Nov.	64	2.00	128	65	1.98	129
	Dec.	72	1.68	121	72	1.68	121
	Total	2,674	.67	1,782	2,647	.68	1,796

Table 9

Colorado River Basin

Flow and Quality of Water Data

Gunnison River near Grand Junction, Colorado

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	65	1.51	98	65	1.51	98
	Feb.	50	1.48	74	50	1.48	74
	March	61	1.26	77	62	1.26	78
	April	86	1.01	87	87	1.01	88
	May	230	.57	131	224	.59	133
	June	437	.43	188	429	.44	190
	July	86	1.13	97	77	1.30	100
	Aug.	67	1.75	117	61	1.95	119
	Sept.	46	2.28	105	42	2.55	107
	Oct.	58	2.40	139	59	2.37	140
	Nov.	74	1.78	132	75	1.77	133
	Dec.	52	1.83	95	53	1.81	96
	Total	1,312	1.02	1,340	1,284	1.06	1,356
1954	Jan.	49	1.75	84	49	1.75	84
	Feb.	45	1.58	71	45	1.58	71
	March	45	1.49	67	46	1.48	68
	April	70	.84	59	71	.85	60
	May	110	.85	93	104	.91	95
	June	39	1.92	75	31	2.48	77
	July	40	2.10	84	31	2.80	87
	Aug.	31	2.64	82	25	3.36	84
	Sept.	52	2.50	130	48	2.75	132
	Oct.	64	1.94	124	65	1.92	125
	Nov.	51	1.92	98	52	1.90	99
	Dec.	49	1.90	93	50	1.88	94
	Total	645	1.64	1,060	617	1.74	1,076
1955	Jan.	46	1.70	78	46	1.70	78
	Feb.	40	1.67	67	40	1.67	67
	March	59	1.47	87	59	1.47	87
	April	108	.74	80	108	.74	80
	May	262	.52	136	257	.54	138
	June	219	.63	138	212	.66	140
	July	46	1.74	80	39	2.13	83
	Aug.	52	1.86	97	47	2.11	99
	Sept.	35	2.48	87	31	2.87	89
	Oct.	38	2.47	94	39	2.44	95
	Nov.	54	2.08	112	55	2.04	112
	Dec.	57	1.65	94	57	1.65	94
	Total	1,016	1.13	1,150	990	1.17	1,162
1956	Jan.	50	1.64	82	50	1.64	82
	Feb.	44	1.59	70	44	1.59	70
	March	56	1.30	73	56	1.30	73
	April	142	.60	85	142	.60	85
	May	324	.45	146	320	.46	147
	June	262	.53	139	257	.55	141
	July	37	1.92	71	31	2.39	74
	Aug.	29	2.07	60	25	2.44	61
	Sept.	20	3.15	63	17	3.76	64
	Oct.	34	2.94	100	34	2.94	100
	Nov.	55	1.95	107	55	1.95	107
	Dec.	47	1.87	88	47	1.87	88
	Total	1,100	.99	1,084	1,078	1.01	1,092
1957	Jan.	52	1.73	90	52	1.73	90
	Feb.	55	1.69	93	55	1.69	93
	March	56	1.36	76	57	1.35	77
	April	135	.67	91	136	.68	92
	May	554	.44	244	448	.55	246
	June	1,168	.32	374	1,160	.32	376
	July	719	.39	281	710	.40	284
	Aug.	224	.83	186	218	.86	188
	Sept.	108	1.47	159	104	1.55	161
	Oct.	106	1.92	204	107	1.92	205
	Nov.	111	1.33	148	112	1.33	149
	Dec.	92	1.26	116	93	1.26	117
	Total	3,380	.61	2,062	3,352	.62	2,087
1958	Jan.	65	1.40	91	65	1.40	91
	Feb.	70	1.50	105	70	1.50	105
	March	82	1.24	102	82	1.24	102
	April	254	.57	145	254	.57	145
	May	873	.32	279	868	.32	281
	June	570	.42	239	564	.43	241
	July	65	1.52	99	58	1.76	102
	Aug.	43	1.74	75	38	2.03	77
	Sept.	51	2.31	118	48	2.50	120
	Oct.	52	2.42	126	53	2.40	127
	Nov.	71	1.82	129	71	1.82	129
	Dec.	65	1.60	104	65	1.60	104
	Total	2,261	.71	1,612	2,236	.73	1,624
1959	Jan.	57	1.58	90	57	1.58	90
	Feb.	50	1.51	75	50	1.51	75
	March	52	1.34	70	52	1.34	70
	April	55	1.10	61	55	1.10	61
	May	167	.75	125	163	.77	126
	June	256	.66	169	251	.68	170
	July	34	2.38	81	29	2.86	83
	Aug.	51	2.01	103	47	2.21	104
	Sept.	41	2.46	101	38	2.68	102
	Oct.	96	1.45	139	96	1.45	139
	Nov.	72	1.39	100	72	1.39	100
	Dec.	50	1.54	77	50	1.54	77
	Total	981	1.21	1,191	960	1.25	1,197
1960	Jan.	49	1.46	72	49	1.46	72
	Feb.	41	1.48	61	41	1.48	61
	March	87	1.26	110	87	1.26	110
	April	270	.45	122	270	.45	122
	May	259	.45	117	255	.46	118
	June	336	.46	155	331	.47	156
	July	58	1.33	77	53	1.49	79
	Aug.	34	2.08	71	30	2.40	72
	Sept.	38	2.22	84	35	2.43	85
	Oct.	51	2.34	119	51	2.34	119
	Nov.	58	1.69	98	58	1.69	98
	Dec.	51	1.59	81	51	1.59	81
	Total	1,332	.88	1,167	1,311	.89	1,173
1961	Jan.	41	1.65	68	41	1.65	68
	Feb.	39	1.55	60	39	1.55	60
	March	55	1.29	71	55	1.29	71
	April	67	1.05	70	67	1.05	70
	May	266	.50	133	262	.51	134
	June	209	.62	130	204	.64	131
	July	34	2.09	71	29	2.52	73
	Aug.	44	2.07	91	40	2.30	92
	Sept.	100	1.66	166	97	1.72	167
	Oct.	107	1.20	128	107	1.20	128
	Nov.	86	1.20	103	86	1.20	103
	Dec.	57	1.37	78	57	1.37	78
	Total	1,105	1.06	1,169	1,084	1.08	1,175
1962	Jan.	53	1.38	73	53	1.38	73
	Feb.	58	1.34	78	58	1.34	78
	March	53	1.23	65	53	1.23	65
	April	395	.37	146	394	.37	146
	May	575	.32	184	573	.32	184
	June	477	.37	176	475	.37	177
	July	219	.67	147	217	.68	148
	Aug.	52	1.71	89	50	1.78	89
	Sept.	63	1.97	124	61	2.03	124
	Oct.	70	1.84	129	70	1.84	129
	Nov.	68	1.62	110	68	1.62	110
	Dec.	54	1.70	92	54	1.70	92
	Total	2,137	.66	1,413	2,126	.67	1,415
1963	Jan.	48	1.67	80	48	1.67	80
	Feb.	70	1.51	106	70	1.51	106
	March	82	1.11	91	82	1.11	91
	April	102	.72	73	102	.72	73
	May	188	.53	100	187	.53	100
	June	92	1.02	94	91	1.03	94
	July	37	2.11	78	36	2.17	78
	Aug.	52	2.00	104	51	2.04	104
	Sept.	51	2.27	116	50	2.32	116
	Oct.	55	2.53	139	55	2.53	139
	Nov.	66	1.70	112	66	1.70	112
	Dec.	49	1.69	83	49	1.69	83
	Total	892	1.32	1,176	887	1.33	1,176
1964	Jan.	43	1.58	68	43	1.58	68
	Feb.	45	1.51	68	45	1.51	68
	March	43	1.51	65	43	1.51	65
	April	78	1.00	78	78	1.00	78
	May	418	.41	171	417	.41	171
	June	316	.50	158	315	.50	158
	July	83	1.20	100	82	1.22	100
	Aug.	93	1.61	150	92	1.63	150
	Sept.	59	1.98	117	58	2.02	117
	Oct.	53	2.21	117	53	2.21	117
	Nov.	65	1.85	120	65	1.85	120
	Dec.	59	1.46	86	59	1.46	86
	Total	1,355	.96	1,298	1,350	.96	1,298

Table 9

Colorado River Basin

Flow and Quality of Water Data

Gunnison River near Grand Junction, Colorado

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	55	1.36	75	55	1.36	75
	Feb.	45	1.29	58	45	1.29	58
	March	52	1.33	69	52	1.33	69
	April	228	.52	119	228	.52	119
	May	582	.36	210	581	.36	210
	June	681	.37	252	680	.37	252
- 1965	July	472	.47	222	471	.47	222
	Aug.	158	.98	155	157	.99	155
	Sept.	161	1.29	208	160	1.30	208
	Oct.	116	1.35	157	116	1.35	157
	Nov.	63	1.94	122	63	1.94	122
	Dec.	60	1.58	95	60	1.58	95
	Total	2,673	.65	1,742	2,668	.65	1,742
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	52	1.67	87	52	1.67	87
	Feb.	37	1.86	69	37	1.86	69
	March	68	1.29	88	68	1.29	88
	April	166	.65	108	166	.65	108
	May	211	.67	141	211	.67	141
	June	125	1.03	[illegible]	125	1.03	129
- 1966	July	51	1.74	89	51	1.74	89
	Aug.	38	2.08	79	38	2.08	79
	Sept.	58	1.98	115	58	1.98	115
	Oct.	65	2.03	132	65	2.03	132
	Nov.	45	2.33	105	45	2.33	105
	Dec.	55	1.76	97	55	1.76	97
	Total	971	1.28	1,239	971	1.28	1,239
	Jan.						
	Feb.						
	March						
	April						
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	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 9
Colorado River Basin
Flow and Quality of Water Data
Gunnison River near Grand Junction, Colorado
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)
1941	2,492	0.83	2,072	2,448	0.86	2,108
1942	2,673	.77	2,057	2,633	.79	2,089
1943	1,786	.88	1,577	1,749	.92	1,605
1944	2,225	.69	1,543	2,185	.72	1,575
1945	1,819	.82	1,499	1,782	.86	1,527
1946	1,261	1.06	1,334	1,223	1.11	1,362
1947	1,937	.83	1,604	1,901	.86	1,630
1948	2,362	.70	1,645	2,328	.72	1,669
1949	2,120	.76	1,601	2,092	.77	1,617
1950	1,335	.99	1,318	1,305	1.02	1,336
1951	1,136	1.03	1,165	1,107	1.07	1,181
1952	2,674	.67	1,782	2,647	.68	1,796
1953	1,312	1.02	1,340	1,284	1.06	1,356
1954	645	1.64	1,060	617	1.74	1,076
1955	1,016	1.13	1,150	990	1.17	1,162
1956	1,100	.99	1,084	1,078	1.01	1,092
1957	3,380	.61	2,062	3,352	.62	2,078
1958	2,261	.71	1,612	2,236	.73	1,624
1959	981	1.21	1,191	960	1.25	1,197
1960	1,332	.88	1,167	1,311	.89	1,173
1961	1,105	1.06	1,169	1,084	1.08	1,175
1962	2,137	.66	1,413	2,126	.67	1,415
1963	892	1.32	1,176	887	1.33	1,176
1964	1,355	.96	1,298	1,350	.96	1,298
1965	2,673	.65	1,742	2,668	.65	1,742
1966	971	1.28	1,239	971	1.28	1,239
Total	44,980		37,900	44,314		38,298
Average	1,730	0.84	1,458	1,704	0.86	1,473

Sampled quality record entire period.
Measured flow record entire period.

Table 10

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cisco, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	139	1.86	259	126	2.05	259
	Feb.	153	1.78	272	140	1.94	272
	March	206	1.64	337	190	1.77	337
	April	445	1.00	445	433	1.03	446
	May	2,355	.42	989	2,281	.44	997
	June	1,582	.46	728	1,442	.51	742
	July	579	.73	423	478	.93	445
	Aug.	251	1.67	419	188	2.34	440
	Sept.	237	1.81	430	202	2.20	445
	Oct.	579	1.10	637	578	1.12	647
	Nov.	311	1.18	367	309	1.22	376
	Dec.	229	1.51	346	226	1.57	354
	Total	7,066	.80	5,652	6,593	.87	5,760
1942	Jan.	181	1.67	302	164	1.84	302
	Feb.	166	1.73	288	149	1.93	288
	March	228	1.52	347	206	1.68	347
	April	1,344	.61	820	1,328	.62	821
	May	1,809	.45	814	1,725	.48	821
	June	1,961	.37	725	1,799	.41	737
	July	579	.78	451	463	1.01	469
	Aug.	185	1.84	340	116	3.09	358
	Sept.	134	2.46	329	96	3.58	344
	Oct.	162	2.33	378	157	2.46	386
	Nov.	186	1.99	370	179	2.11	378
	Dec.	164	1.96	322	156	2.11	329
	Total	7,099	.77	5,486	6,538	.85	5,580
1943	Jan.	153	1.90	291	140	2.08	291
	Feb.	146	1.85	270	133	2.03	270
	March	174	1.77	308	158	1.95	308
	April	709	.64	454	697	.65	454
	May	996	.46	458	930	.50	464
	June	1,365	.38	518	1,237	.43	527
	July	502	.78	392	410	.99	407
	Aug.	368	1.26	463	314	1.52	478
	Sept.	212	1.85	392	181	2.23	403
	Oct.	184	1.84	339	180	1.92	346
	Nov.	215	1.47	317	210	1.54	323
	Dec.	190	1.56	296	184	1.64	301
	Total	5,214	.86	4,498	4,774	.96	4,572
1944	Jan.	140	1.77	248	128	1.94	248
	Feb.	152	1.56	237	140	1.69	237
	March	166	1.51	251	151	1.66	251
	April	304	1.09	331	293	1.13	332
	May	1,784	.41	732	1,717	.43	739
	June	1,843	.35	645	1,719	.38	659
	July	677	.61	413	588	.73	432
	Aug.	149	1.62	241	194	1.33	259
	Sept.	99	2.54	252	68	3.93	267
	Oct.	159	2.18	347	159	2.23	355
	Nov.	196	1.78	348	194	1.83	356
	Dec.	171	1.70	291	168	1.77	298
	Total	5,840	.74	4,336	5,519	.80	4,433
1945	Jan.	149	1.73	258	136	1.90	258
	Feb.	151	1.74	263	138	1.90	263
	March	178	1.56	277	162	1.71	277
	April	329	.88	289	217	.91	289
	May	1,495	.36	538	1,430	.38	544
	June	1,311	.37	485	1,185	.42	495
	July	676	.67	453	585	.80	468
	Aug.	446	1.01	451	392	1.19	466
	Sept.	146	1.85	270	115	2.42	281
	Oct.	217	1.75	380	213	1.82	387
	Nov.	224	1.41	316	219	1.47	322
	Dec.	183	1.26	230	177	1.33	235
	Total	5,505	.76	4,210	5,069	.85	4,285
1946	Jan.	174	1.37	239	164	1.46	239
	Feb.	155	1.27	197	145	1.36	197
	March	191	1.24	236	178	1.32	236
	April	525	.61	320	516	.62	320
	May	726	.49	356	667	.54	362
	June	1,027	.42	432	921	.48	443
	July	309	.98	303	230	1.38	318
	Aug.	196	1.66	325	149	2.29	341
	Sept.	135	2.10	283	108	2.72	294
	Oct.	206	1.85	382	205	1.89	389
	Nov.	206	1.56	322	205	1.60	328
	Dec.	208	1.37	285	205	1.42	291
	Total	4,058	.91	3,680	3,693	1.02	3,758
1947	Jan.	145	1.58	[illegible]	127	1.80	229
	Feb.	151	1.44	[illegible]	133	1.63	217
	March	189	1.39	[illegible]	166	1.58	263
	April	316	.85	[illegible]	298	.90	268
	May	1,423	.40	[illegible]	1,344	.43	573
	June	1,594	.39	[illegible]	1,434	.44	629
	July	985	.47	463	869	.55	475
	Aug.	369	1.21	447	302	1.52	460
	Sept.	259	1.44	373	223	1.72	384
	Oct.	328	1.47	483	318	1.54	489
	Nov.	277	1.24	343	266	1.31	348
	Dec.	223	1.40	312	211	1.50	317
	Total	6,259	.73	4,588	5,691	.82	4,652
1948	Jan.	191	1.34	257	178	1.44	257
	Feb.	210	1.33	280	197	1.42	280
	March	245	1.36	333	228	1.46	333
	April	830	.64	531	817	.65	531
	May	1,959	.36	705	1,901	.37	709
	June	1,499	.39	585	1,383	.43	589
	July	446	.86	384	358	1.09	392
	Aug.	225	1.52	342	175	2.00	351
	Sept.	121	1.88	228	94	2.50	235
	Oct.	175	1.96	344	167	2.08	348
	Nov.	204	1.67	341	195	1.76	344
	Dec.	186	1.66	308	177	1.76	311
	Total	6,291	.74	4,638	5,870	.80	4,680
1949	Jan.	188	1.54	289	171	1.68	288
	Feb.	187	1.35	253	170	1.48	252
	March	243	1.40	340	233	1.52	340
	April	615	.67	412	599	.69	412
	May	1,289	.41	529	1,228	.43	531
	June	1,910	.37	707	1,781	.40	708
	July	908	.55	499	812	.62	503
	Aug.	224	1.58	354	170	2.12	360
	Sept.	158	2.08	328	130	2.56	333
	Oct.	225	1.83	411	212	1.95	413
	Nov.	210	1.71	359	197	1.83	361
	Dec.	180	1.66	299	165	1.82	301
	Total	6,337	.75	4,780	5,858	.82	4,802
1950	Jan.	199	1.52	302	195	1.55	302
	Feb.	201	1.44	289	197	1.47	289
	March	209	1.31	274	205	1.34	275
	April	541	.61	330	538	.61	331
	May	764	.51	389	737	.53	392
	June	1,113	.42	467	1,065	.44	474
	July	347	1.03	357	310	1.18	366
	Aug.	109	2.02	220	86	2.64	227
	Sept.	138	2.12	292	124	2.41	299
	Oct.	125	2.35	294	125	2.38	298
	Nov.	161	1.96	316	161	1.99	320
	Dec.	167	1.75	293	167	1.77	296
	Total	4,074	.94	3,823	3,910	.99	3,869
1951	Jan.	153	1.69	258	148	1.74	258
	Feb.	151	1.51	228	146	1.56	228
	March	161	1.46	236	154	1.54	237
	April	173	1.21	209	169	1.24	210
	May	758	.54	409	728	.57	412
	June	1,173	.43	505	1,116	.46	510
	July	530	.68	360	487	.76	368
	Aug.	238	1.47	350	211	1.70	358
	Sept.	131	2.06	270	116	2.39	277
	Oct.	169	1.99	336	169	2.01	340
	Nov.	178	1.74	310	177	1.77	314
	Dec.	172	1.67	287	171	1.70	291
	Total	3,987	.94	3,758	3,792	1.00	3,803
1952	Jan.	191	1.59	303	182	1.66	303
	Feb.	156	1.65	257	147	1.75	257
	March	194	1.48	287	184	1.55	286
	April	969	.53	514	961	.52	515
	May	2,152	.35	753	2,114	.36	756
	June	2,314	.33	764	2,238	.34	768
	July	641	.72	462	586	.80	469
	Aug.	358	1.18	422	327	1.32	429
	Sept.	213	1.58	337	196	1.75	343
	Oct.	166	1.92	318	161	1.99	321
	Nov.	177	1.89	334	172	1.96	337
	Dec.	188	1.66	313	181	1.74	315
	Total	7,719	.66	5,064	7,448	.68	5,099

Table 10

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cisco, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	185	1.65	306	181	1.69	306
	Feb.	142	1.63	232	138	1.68	232
	March	187	1.52	284	183	1.56	285
	April	250	1.00	250	247	1.02	251
	May	606	.60	364	583	.63	367
	June	1,399	.41	574	1,358	.43	579
	July	353	.95	335	321	1.06	341
	Aug.	256	1.23	315	237	1.36	322
	Sept.	128	2.22	284	116	2.50	290
	Oct.	177	1.89	334	178	1.89	337
	Nov.	207	1.77	366	207	1.78	369
	Dec.	171	1.75	299	171	1.76	301
	Total	4,061	.97	3,943	3,920	1.02	3,980
1954	Jan.	177	1.76	312	175	1.78	312
	Feb.	143	1.65	236	141	1.67	236
	March	161	1.46	236	160	1.48	237
	April	221	.98	217	220	.99	218
	May	436	.74	323	418	.78	327
	June	217	1.17	254	190	1.37	260
	July	150	1.69	253	129	2.02	261
	Aug.	98	2.30	225	84	2.76	232
	Sept.	171	2.09	358	163	2.23	364
	Oct.	215	1.59	342	217	1.59	345
	Nov.	164	1.70	278	165	1.70	281
	Dec.	140	1.90	266	141	1.91	269
	Total	2,293	1.44	3,300	2,203	1.52	3,342
1955	Jan.	134	1.84	247	132	1.87	247
	Feb.	121	1.78	215	119	1.81	215
	March	198	1.33	263	196	1.34	263
	April	321	.82	263	319	.82	263
	May	752	.50	376	736	.52	380
	June	689	.55	379	662	.58	383
	July	214	1.21	259	192	1.37	264
	Aug.	185	1.66	307	172	1.82	313
	Sept.	108	2.16	233	99	2.40	238
	Oct.	119	2.19	261	120	2.19	263
	Nov.	169	1.89	319	170	1.88	320
	Dec.	176	1.70	299	175	1.71	300
	Total	3,186	1.07	3,421	3,092	1.12	3,449
1956	Jan.	155	1.69	262	153	1.71	262
	Feb.	141	1.70	239	139	1.72	239
	March	187	1.50	281	185	1.52	281
	April	356	.72	256	354	.72	256
	May	1,005	.45	452	993	.46	454
	June	924	.44	406	903	.45	409
	July	172	1.47	253	154	1.67	257
	Aug.	119	1.97	234	108	2.19	237
	Sept.	81	2.38	193	75	2.61	196
	Oct.	121	2.22	269	120	2.24	269
	Nov.	165	1.87	308	163	1.89	308
	Dec.	142	1.94	275	140	1.96	275
	Total	3,568	.96	3,428	3,487	.99	3,443
1957	Jan.	164	1.80	296	162	1.83	296
	Feb.	168	1.55	260	166	1.57	260
	March	167	1.56	260	166	1.57	261
	April	398	.86	342	397	.86	343
	May	1,375	.44	605	1,356	.45	609
	June	2,859	.29	829	2,830	.30	836
	July	1,952	.37	722	1,929	.38	731
	Aug.	661	.83	549	645	.86	557
	Sept.	314	1.21	380	305	1.27	387
	Oct.	292	1.78	520	295	1.77	523
	Nov.	300	1.44	431	302	1.44	434
	Dec.	239	1.71	408	241	1.70	411
	Total	8,889	.63	5,602	8,794	.64	5,648
1958	Jan.	200	1.52	304	199	1.53	304
	Feb.	225	1.34	302	224	1.35	302
	March	254	1.29	328	252	1.30	328
	April	756	.53	401	755	.53	401
	May	2,032	.31	630	2,017	.31	634
	June	1,560	.40	624	1,538	.41	630
	July	234	1.22	285	215	1.36	292
	Aug.	109	2.17	236	97	2.49	242
	Sept.	153	2.14	328	146	2.28	333
	Oct.	155	1.99	308	157	1.98	311
	Nov.	190	1.66	315	191	1.66	317
	Dec.	176	1.63	287	177	1.63	288
	Total	6,044	.72	4,348	5,968	.73	4,382

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	168	1.71	287	168	1.71	287
	Feb.	153	1.41	216	153	1.41	216
	March	150	1.60	240	150	1.60	240
	April	163	1.39	227	163	1.39	227
	May	536	.65	[illegible]	[illegible]	.66	350
	June	924	.50	[illegible]	[illegible]	.51	464
	July	214	1.15	246	207	1.20	248
	Aug.	160	1.91	306	155	1.99	308
	Sept.	124	2.14	265	120	2.22	267
	Oct.	250	1.43	358	250	1.43	358
	Nov.	210	1.31	275	210	1.31	275
	Dec.	163	1.54	251	163	1.54	251
	Total	3,215	1.08	3,481	3,187	1.10	3,491
1960	Jan.	164	1.51	248	164	1.51	248
	Feb.	143	1.51	216	143	1.51	216
	March	273	1.22	333	173	1.22	333
	April	629	.51	321	629	.51	321
	May	758	.49	371	753	.50	373
	June	1,068	.42	448	1,061	.42	450
	July	251	1.04	261	244	1.08	263
	Aug.	106	1.96	208	101	2.08	210
	Sept.	117	2.16	253	113	2.26	255
	Oct.	153	1.94	297	153	1.94	297
	Nov.	177	1.67	296	177	1.67	296
	Dec.	165	1.48	244	165	1.48	244
	Total	4,004	.87	3,496	3,975	.88	3,506
1961	Jan.	156	1.43	222	156	1.43	222
	Feb.	140	1.52	213	140	1.52	213
	March	162	1.44	233	162	1.44	233
	April	206	1.14	235	206	1.14	235
	May	677	.57	386	672	.58	388
	June	664	.51	339	657	.52	341
	July	130	1.62	211	123	1.73	213
	Aug.	138	2.01	277	133	2.10	279
	Sept.	316	1.49	471	312	1.52	473
	Oct.	357	1.07	382	357	1.07	382
	Nov.	252	1.23	310	252	1.23	310
	Dec.	197	1.40	276	1197	1.40	276
	Total	3,395	1.05	3,555	3,367	1.06	3,565
1962	Jan.	182	1.29	235	182	1.29	235
	Feb.	261	1.12	292	261	1.12	292
	March	246	1.05	258	246	1.05	258
	April	1,054	.44	464	1,053	.44	464
	May	1,603	.38	609	1,601	.38	609
	June	1,400	.38	532	1,398	.38	533
	July	765	.58	444	763	.58	445
	Aug.	206	1.42	293	204	1.44	293
	Sept.	173	1.99	344	171	2.01	344
	Oct.	262	1.43	375	262	1.43	375
	Nov.	243	1.31	318	243	1.31	318
	Dec.	180	1.77	319	180	1.77	319
	Total	6,575	.68	4,483	6,564	.68	4,485
1963	Jan.	163	1.52	248	163	1.52	248
	Feb.	193	1.51	292	193	1.51	292
	March	219	1.30	285	219	1.30	285
	April	245	.91	223	245	.91	223
	May	517	.62	320	516	.62	320
	June	332	.93	309	331	.93	309
	July	114	1.94	221	113	1.96	221
	Aug.	168	1.94	326	167	1.95	326
	Sept.	183	1.80	329	182	1.81	329
	Oct.	134	2.14	287	134	2.14	287
	Nov.	179	1.62	290	179	1.62	290
	Dec.	138	1.84	254	138	1.84	254
	Total	2,585	1.31	3,384	2,580	1.31	3,384
1964	Jan.	132	1.85	244	132	1.85	244
	Feb.	121	1.79	217	121	1.79	217
	March	128	1.87	239	128	1.87	239
	April	214	1.11	238	214	1.11	238
	May	861	.50	430	860	.50	430
	June	780	.50	390	779	.50	390
	July	276	1.07	295	275	1.07	295
	Aug.	241	1.51	264	240	1.52	364
	Sept.	153	1.88	286	152	1.89	288
	Oct.	164	1.93	317	164	1.93	317
	Nov.	182	1.81	329	182	1.81	329
	Dec.	181	1.59	288	181	1.59	288
	Total	3,433	1.06	3,639	3,428	1.06	3,639

Table 10

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cisco, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	162	1.55	251	162	1.55	251
	Feb.	140	1.63	228	140	1.63	228
	March	154	1.59	245	154	1.59	245
	April	562	.68	382	562	.68	382
	May	1,272	.39	496	1,271	.39	496
	June	1,654	.38	629	1,653	.38	629
-1965	July	1,116	.52	580	1,115	.52	580
	Aug.	447	.94	420	446	.94	420
	Sept.	369	1.21	446	368	1.21	446
	Oct.	360	1.32	475	360	1.32	475
	Nov.	249	1.65	411	249	1.65	411
	Dec.	237	1.39	329	237	1.39	329
	Total	6,722	.73	4,892	6,717	.73	4,892
	Jan.						
	Feb.						
	March						
	April						
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	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	200	1.38	276	200	1.38	276
	Feb.	169	1.34	226	169	1.34	226
	March	278	.96	267	278	.96	267
	April	438	.61	267	438	.61	267
	May	697	.53	369	697	.53	369
	June	429	.83	356	429	.83	356
-1966	July	185	1.50	278	185	1.50	278
	Aug.	120	1.89	227	120	1.89	227
	Sept.	145	2.01	291	145	2.01	291
	Oct.	175	1.87	327	175	1.87	327
	Nov.	153	1.89	289	153	1.89	289
	Dec.	174	1.71	298	174	1.71	298
	Total	3,163	1.10	3,471	3,163	1.10	3,471
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	Oct.						
	Nov.						
	Dec.						
	Total						

Table 10
Colorado River Basin
Flow and Quality of Water Data
Colorado River near Cisco, Utah
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	7,066	0.80	5,652	6,593	0.87	5,760
1942	7,099	.77	5,486	6,538	.85	5,580
1943	5,214	.86	4,498	4,774	.96	4,572
1944	5,840	.74	4,336	5,519	.80	4,433
1945	5,505	.76	4,210	5,069	.85	4,285
1946	4,058	.91	3,680	3,693	1.02	3,758
1947	6,259	.73	4,588	5,691	.82	4,652
1948	6,291	.74	4,638	5,870	.80	4,680
1949	6,337	.75	4,780	5,858	.82	4,802
1950	4,074	.94	3,823	3,910	.99	3,869
1951	3,987	.94	3,758	3,792	1.00	3,803
1952	7,719	.66	5,064	7,448	.68	5,099
1953	4,061	.97	3,943	3,920	1.02	3,980
1954	2,293	1.44	3,300	2,203	1.52	3,342
1955	3,186	1.07	3,421	3,092	1.12	3,449
1956	3,568	.96	3,428	3,487	.99	3,443
1957	8,889	.63	5,602	8,794	.64	5,648
1958	6,044	.72	4,348	5,968	.73	4,382
1959	3,215	1.08	3,481	3,187	1.10	3,491
1960	4,004	.87	3,496	3,976	.88	3,506
1961	3,395	1.05	3,555	3,367	1.06	3,565
1962	6,575	.68	4,483	6,564	.68	4,485
1963	2,585	1.31	3,384	2,580	1.31	3,384
1964	3,433	1.06	3,639	3,428	1.06	3,639
1965	6,722	.73	4,892	6,717	.73	4,892
1966	3,163	1.10	3,471	3,163	1.10	3,471
Total	130,582		108,956	125,201		109,970
Average	5,022	0.83	4,191	4,815	0.88	4,230

Sampled quality record entire period.
Measured flow record entire period.

Table 11

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Archuleta, New Mexico

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	22	0.41	9	22	0.41	9
	Feb.	46	.35	16	46	.35	16
	March	98	.38	37	98	.38	37
	April	251	.21	53	249	.21	53
	May	709	.16	110	708	.16	110
	June	560	.12	68	558	.12	68
	July	324	.14	46	322	.14	46
	Aug.	84	.19	16	82	.20	16
	Sept.	68	.24	16	65	.25	16
	Oct.	273	.12	33	273	.12	33
	Nov.	87	.17	15	87	.17	15
	Dec.	52	.21	11	52	.21	11
	Total	2,574	.17	430	2,562	.17	430
1942	Jan.	45	.33	15	45	.33	15
	Feb.	48	.25	12	48	.25	12
	March	54	.42	23	54	.42	23
	April	383	.21	82	381	.22	82
	May	320	.15	48	319	.15	48
	June	310	.12	38	308	.12	38
	July	76	.18	14	74	.19	14
	Aug.	41	.22	9	39	.23	9
	Sept.	28	.25	7	25	.28	7
	Oct.	23	.26	6	23	.26	6
	Nov.	22	.27	6	22	.27	6
	Dec.	16	.38	6	16	.38	6
	Total	1,366	.19	266	1,354	.20	266
1943	Jan.	16	.44	7	16	.44	7
	Feb.	26	.35	9	26	.35	9
	March	55	.38	21	55	.38	21
	April	198	.19	37	196	.19	37
	May	184	.16	30	183	.16	30
	June	134	.15	20	132	.15	20
	July	51	.24	12	49	.24	12
	Aug.	48	.21	10	46	.22	10
	Sept.	28	.25	7	25	.28	7
	Oct.	35	.20	7	35	.20	7
	Nov.	24	.29	7	24	.29	7
	Dec.	19	.32	6	19	.32	6
	Total	818	.21	173	806	.21	173
1944	Jan.	16	.38	6	16	.38	6
	Feb.	19	.32	6	19	.32	6
	March	34	.47	16	34	.47	16
	April	131	.21	27	129	.21	27
	May	371	.16	61	370	.16	61
	June	382	.13	49	380	.13	49
	July	134	.16	22	132	.17	22
	Aug.	45	.20	9	43	.21	9
	Sept.	43	.23	10	40	.25	10
	Oct.	41	.22	9	41	.22	9
	Nov.	21	.29	6	21	.29	6
	Dec.	14	.43	6	14	.43	6
	Total	1,251	.18	227	1,239	.18	227
1945	Jan.	14	.43	6	14	.43	6
	Feb.	22	.45	10	22	.45	10
	March	35	.49	17	35	.49	17
	April	143	.20	28	141	.20	28
	May	278	.16	44	277	.16	44
	June	209	.13	28	207	.14	28
	July	68	.21	14	66	.21	14
	Aug.	40	.22	9	38	.24	9
	Sept.	21	.24	5	18	.28	5
	Oct.	30	.37	11	30	.37	11
	Nov.	19	.37	7	19	.37	7
	Dec.	12	.50	6	12	.50	6
	Total	891	.21	185	879	.21	185
1946	Jan.	14	.43	6	14	.43	6
	Feb.	17	.47	8	17	.47	8
	March	22	.50	11	22	.50	11
	April	66	.23	15	64	.23	15
	May	73	.18	13	72	.18	13
	June	87	.18	16	85	.19	16
	July	27	.33	9	25	.36	9
	Aug.	40	.35	14	38	.37	14
	Sept.	29	.31	9	26	.35	9
	Oct.	36	.31	11	36	.31	11
	Nov.	26	.35	9	26	.35	9
	Dec.	19	.32	6	19	.32	6
	Total	456	.28	127	444	.29	127
1947	Jan.	15	0.40	6	15	0.40	6
	Feb.	24	.38	[illegible]	24	.38	9
	March	32	.34	[illegible]	32	.34	11
	April	50	.24	12	48	.25	12
	May	186	.17	[illegible]	185	.17	32
	June	140	.13	[illegible]	138	.13	18
	July	43	.28	12	41	.29	12
	Aug.	73	.30	22	71	.31	22
	Sept.	56	.23	13	53	.25	13
	Oct.	77	.21	16	77	.21	16
	Nov.	37	.22	8	37	.22	8
	Dec.	27	.26	7	27	.26	7
	Total	760	.22	166	748	.22	166
1948	Jan.	27	.26	7	27	.26	7
	Feb.	39	.33	13	39	.33	13
	March	43	.35	15	43	.35	15
	April	246	.20	49	244	.20	49
	May	306	.14	43	305	.14	43
	June	338	.12	40	336	.12	40
	July	79	.16	13	77	.17	13
	Aug.	49	.24	12	47	.26	12
	Sept.	22	.32	7	19	.37	7
	Oct.	23	.35	8	23	.35	8
	Nov.	18	.39	7	18	.39	7
	Dec.	13	.46	6	13	.46	6
	Total	1,203	.18	220	1,191	.18	220
1949	Jan.	16	.44	7	16	.44	7
	Feb.	25	.36	9	25	.36	9
	March	73	.37	27	73	.37	27
	April	228	.24	55	226	.24	55
	May	318	.15	48	317	.15	48
	June	406	.13	53	404	.13	53
	July	199	.15	30	197	.15	30
	Aug.	57	.24	14	55	.25	14
	Sept.	33	.27	9	30	.30	9
	Oct.	30	.30	9	30	.30	9
	Nov.	21	.38	8	21	.38	8
	Dec.	14	.50	7	14	.50	7
	Total	1,420	.19	276	1,408	.20	276
1950	Jan.	16	.37	6	16	.37	6
	Feb.	29	.41	12	29	.41	12
	March	31	.42	13	31	.42	13
	April	116	.19	22	114	.19	22
	May	126	.15	19	125	.15	19
	June	112	.16	18	110	.16	18
	July	44	.27	12	42	.29	12
	Aug.	20	.35	7	18	.39	7
	Sept.	24	.38	9	21	.43	9
	Oct.	20	.35	7	20	.35	7
	Nov.	14	.50	7	14	.50	7
	Dec.	12	.50	6	12	.50	6
	Total	564	.24	138	552	.25	138
1951	Jan.	10	.50	5	10	.50	5
	Feb.	11	.45	5	11	.45	5
	March	20	.45	9	20	.45	9
	April	35	.29	10	33	.30	10
	May	117	.18	21	116	.18	21
	June	94	.17	16	92	.17	16
	July	21	.38	8	19	.42	8
	Aug.	33	.36	12	31	.39	12
	Sept.	22	.36	8	19	.42	8
	Oct.	17	.47	8	17	.47	8
	Nov.	15	.47	7	15	.47	7
	Dec.	18	.44	8	18	.44	8
	Total	413	.28	117	401	.29	117
1952	Jan.	19	.53	10	19	.53	10
	Feb.	19	.53	10	19	.53	10
	March	47	.49	23	47	.49	23
	April	326	.26	85	324	.26	85
	May	396	.16	63	395	.16	63
	June	454	.13	59	452	.13	59
	July	136	.18	24	134	.18	24
	Aug.	66	.26	17	64	.27	17
	Sept.	33	.27	9	30	.30	9
	Oct.	22	.32	7	22	.32	7
	Nov.	16	.44	7	16	.44	7
	Dec.	18	.39	7	18	.39	7
	Total	1,552	.21	321	1,540	.21	321

Table 11

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Archuleta, New Mexico

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	18	0.39	7	18	0.39	7
	Feb.	18	.39	7	18	.39	7
	March	37	.41	15	37	.41	15
	April	75	.24	18	73	.25	18
	May	117	.19	22	116	.19	22
	June	148	.15	22	146	.15	22
- 1953	July	41	.32	13	39	.33	13
	Aug.	33	.33	11	31	.35	11
	Sept.	16	.44	7	13	.54	7
	Oct.	23	.43	10	23	.43	10
	Nov.	23	.43	10	23	.43	10
	Dec.	14	.50	7	14	.50	7
	Total	563	.26	149	551	.27	149
	Jan.	11	.45	5	11	.45	5
	Feb.	21	.48	10	21	.48	10
	March	28	.46	13	28	.46	13
	April	90	.21	19	88	.22	19
	May	143	.18	26	142	.18	26
	June	67	.19	13	65	.20	13
- 1954	July	37	.41	15	35	.43	15
	Aug.	45	.29	13	43	.30	13
	Sept.	30	.43	13	27	.48	13
	Oct.	42	.24	10	42	.24	10
	Nov.	18	.39	7	18	.39	7
	Dec.	13	.46	6	13	.46	6
	Total	545	.28	150	533	.28	150
	Jan.	12	.42	5	12	.42	5
	Feb.	13	.31	4	13	.31	4
	March	27	.37	10	27	.37	10
	April	45	.24	11	43	.26	11
	May	132	.18	24	131	.18	24
	June	119	.16	19	117	.16	19
- 1955	July	42	.29	12	40	.30	12
	Aug.	67	.28	19	65	.29	19
	Sept.	28	.29	8	25	.32	8
	Oct.	20	.30	6	20	.30	6
	Nov.	17	.35	6	17	.35	6
	Dec.	15	.40	6	15	.40	6
	Total	537	.24	130	525	.25	130
	Jan.	16	.38	6	16	.38	6
	Feb.	15	.40	6	15	.40	6
	March	48	.33	16	48	.33	16
	April	79	.20	16	77	.21	16
	May	174	.14	24	173	.14	24
	June	117	.15	18	115	.16	18
- 1956	July	25	.32	8	23	.35	8
	Aug.	23	.35	8	21	.38	8
	Sept.	11	.36	4	8	.50	4
	Oct.	12	.42	5	12	.42	5
	Nov.	11	.45	5	11	.45	5
	Dec.	9	.44	4	9	.44	4
	Total	540	.22	120	528	.23	120
	Jan.	13	.46	6	13	.46	6
	Feb.	30	.47	14	30	.47	14
	March	46	.43	20	46	.43	20
	April	120	.28	34	118	.29	34
	May	222	.19	42	221	.19	42
	June	480	.13	62	478	.13	62
- 1957	July	326	.16	52	324	.16	52
	Aug.	164	.22	36	162	.22	36
	Sept.	67	.19	13	64	.20	13
	Oct.	67	.30	20	67	.30	20
	Nov.	68	.26	18	66	.26	18
	Dec.	44	.30	13	44	.30	13
	Total	1,647	.20	330	1,635	.20	330
	Jan.	22	.36	8	22	.36	8
	Feb.	51	.43	22	51	.43	22
	March	77	.42	32	77	.42	32
	April	279	.30	84	277	.30	84
	May	460	.17	78	459	.17	78
	June	270	.13	35	268	.13	35
- 1958	July	42	.26	11	40	.28	11
	Aug.	35	.31	11	33	.33	11
	Sept.	40	.30	12	37	.32	12
	Oct.	25	.36	9	25	.36	9
	Nov.	17	.41	7	17	.41	7
	Dec.	14	.43	6	14	.43	6
	Total	1,332	.24	315	1,320	.24	315
	Jan.	11	0.45	5	11	0.45	5
	Feb.	14	.43	6	14	.43	6
	March	18	.44	8	18	.44	8
	April	37	.30	11	35	.31	11
	May	87	.18	16	86	.19	16
	June	84	.15	13	82	.16	13
- 1959	July	18	.33	6	16	.37	6
	Aug.	34	.32	11	32	.34	11
	Sept.	15	.33	5	12	.42	5
	Oct.	60	.30	18	60	.30	18
	Nov.	39	.31	12	39	.31	12
	Dec.	20	.35	7	20	.35	7
	Total	437	.27	118	425	.28	118
	Jan.	14	.43	6	14	.43	6
	Feb.	16	.44	7	16	.44	7
	March	175	.34	60	175	.34	60
	April	240	.19	46	238	.19	46
	May	193	.17	33	192	.17	33
	June	232	.13	30	230	.13	30
- 1960	July	55	.24	13	53	.25	13
	Aug.	25	.28	7	23	.30	7
	Sept.	23	.30	7	20	.35	7
	Oct.	26	.38	10	26	.38	10
	Nov.	16	.44	7	16	.44	7
	Dec.	14	.50	7	14	.50	7
	Total	1,029	.23	233	1,017	.23	233
	Jan.	12	.42	5	12	.42	5
	Feb.	16	.44	7	16	.44	7
	March	43	.43	19	43	.43	19
	April	113	.26	29	111	.26	29
	May	192	.15	29	191	.15	29
	June	122	.16	19	120	.16	19
- 1961	July	38	.29	11	36	.31	11
	Aug.	52	.29	15	50	.30	15
	Sept.	58	.26	15	55	.27	15
	Oct.	52	.23	12	52	.23	12
	Nov.	34	.29	10	34	.29	10
	Dec.	18	.33	6	18	.33	6
	Total	750	.24	177	738	.24	177
	Jan.	15	.40	6	15	.40	6
	Feb.	42	.38	16	42	.38	16
	March	51	.39	20	51	.39	20
	April	242	.20	48	240	.20	48
	May	228	.14	32	227	.14	32
	June	165	.14	23	163	.14	23
- 1962	July	39	.18	7	37	.19	7
	Aug.	29	.24	7	27	.26	7
	Sept.	19	.26	5	16	.31	5
	Oct.	18	.33	6	18	.33	6
	Nov.	14	.36	5	14	.36	5
	Dec.	10	.40	4	10	.40	4
	Total	872	.21	179	860	.21	179
	Jan.	7	.43	3	7	.43	3
	Feb.	8	.50	4	8	.50	4
	March	15	.40	6	15	.40	6
	April	31	.39	12	30	.39	12
	May	19	.26	5	18	.28	5
	June	19	.21	4	18	.22	4
- 1963	July	20	.20	4	19	.21	4
	Aug.	22	.18	4	20	.20	4
	Sept.	20	.20	4	19	.21	4
	Oct.	24	.25	6	24	.25	6
	Nov.	24	.25	6	24	.25	6
	Dec.	24	.29	7	24	.29	7
	Total	233	.28	65	226	.29	65
	Jan.	17	.35	6	17	.35	6
	Feb.	13	.31	4	13	.31	4
	March	13	.31	4	13	.31	4
	April	15	.33	5	15	.33	5
	May	34	.29	10	34	.29	10
	June	82	.28	23	82	.28	23
- 1964	July	108	.25	27	108	.25	27
	Aug.	48	.23	11	47	.23	11
	Sept.	26	.23	6	25	.24	6
	Oct.	28	.21	6	28	.21	6
	Nov.	21	.29	6	21	.29	6
	Dec.	32	.28	9	32	.28	9
	Total	437	.27	117	435	.27	117

Table II

Colorado River · Basin

Flow and Quality of Water Data

San Juan River near Archuleta, New Mexico

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	90	0.29	26	90	0.29	26
	Feb.	92	.30	28	92	.30	28
	March	52	.37	19	52	.37	19
	April	85	.35	30	85	.35	30
	May	138	.29	40	138	.29	40
	June	215	.20	43	215	.20	43
1965	July	102	.18	18	102	.18	18
	Aug.	136	.17	23	136	.17	23
	Sept.	112	.17	19	112	.17	19
	Oct.	131	.13	17	131	.13	17
	Nov.	180	.16	29	180	.16	29
	Dec.	177	.18	32	177	.18	32
	Total	1,510	.21	324	1,510	.21	324

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	168	0.21	35	168	0.21	35
	Feb.	94	.26	24	[illegible]	.26	24
	March	114	.29	33	114	.29	33
	April	181	.28	51	181	.28	51
	May	129	.26	34	129	.26	34
	June	27	.22	6	27	.22	6
1966	July	28	.18	5	28	.18	5
	Aug.	29	.17	5	29	.17	5
	Sept.	27	.19	5	27	.19	5
	Oct.	91	.18	16	91	.18	16
	Nov.	47	.19	9	47	.19	9
	Dec.	25	.24	6	25	.24	6
	Total	960	.24	229	960	.24	229

Table 11
Colorado River Basin
Flow and Quality of Water Data
San Juan River near Archuleta, New Mexico
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)
1941	2,574	0.17	430	2,562	0.17	430
1942	1,366	.19	266	1,354	.20	266
1943	818	.21	173	806	.21	173
1944	1,251	.18	227	1,239	.18	227
1945	891	.21	185	879	.21	185
1946	456	.28	127	444	.29	127
1947	760	.22	166	748	.22	166
1948	1,203	.18	220	1,191	.18	220
1949	1,420	.19	276	1,408	.20	276
1950	564	.24	138	552	.25	138
1951	413	.28	117	401	.29	117
1952	1,552	.21	321	1,540	.21	321
1953	563	.26	149	551	.27	149
1954	545	.28	150	533	.28	150
1955	537	.24	130	525	.25	130
1956	540	.22	120	528	.23	120
1957	1,647	.20	330	1,635	.20	330
1958	1,332	.24	315	1,320	.24	315
1959	437	.27	118	425	.28	118
1960	1,029	.23	233	1,017	.23	233
1961	750	.24	177	738	.24	177
1962	872	.21	179	860	.21	179
1963	233	.28	65	226	.29	65
1964	437	.27	117	435	.27	117
1965	1,510	.21	324	1,510	.21	324
1966	960	.24	229	960	.24	229
Total	24,660		5,282	24,387		5,282
Average	948	0.21	203	938	0.22	203

Sampled quality record, October 1945 to December 1966;
remainder by correlation.
Measured flow record entire period.
Adjusted quality and flow record for station near Blanco,
October 1945 to November 1954.

Table 12

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Bluff, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	78	1.01	79	70	1.01	79
	Feb.	127	.98	124	127	.98	124
	March	211	.78	165	211	.78	165
	April	392	.62	243	388	.63	246
	May	1,323	.50	662	1,314	.51	666
	June	915	.30	275	903	.31	280
	July	526	.30	158	513	.32	163
	Aug.	174	.70	122	161	.79	127
	Sept.	202	.87	176	192	.94	180
	Oct.	655	.64	419	655	.64	419
	Nov.	191	.61	117	191	.61	117
	Dec.	104	.81	84	104	.81	84
	Total	4,898	.54	2,624	4,837	.55	2,650
1942	Jan.	81	.93	75	81	.93	75
	Feb.	68	.93	63	68	.93	63
	March	126	.95	120	126	.95	120
	April	602	.51	307	598	.52	310
	May	479	.38	182	470	.40	186
	June	533	.26	139	521	.28	144
	July	150	.48	72	137	.56	77
	Aug.	51	.82	42	38	1.24	47
	Sept.	38	1.00	38	28	1.50	42
	Oct.	37	1.22	45	37	1.22	45
	Nov.	39	1.23	48	39	1.23	48
	Dec.	43	1.26	54	43	1.26	54
	Total	2,247	.53	1,185	2,191	.55	1,211
1943	Jan.	43	1.26	54	43	1.26	54
	Feb.	49	1.18	[illegible]	49	1.18	58
	March	95	1.09	[illegible]	95	1.09	104
	April	293	.47	138	289	.49	141
	May	332	.39	129	323	.41	133
	June	254	.38	96	242	.42	101
	July	106	.57	60	93	.70	65
	Aug.	91	1.01	92	78	1.24	97
	Sept.	62	.90	56	52	1.15	60
	Oct.	58	1.00	58	58	1.00	58
	Nov.	59	.97	57	59	.97	57
	Dec.	51	1.12	57	51	1.12	57
	Total	1,493	.64	959	1,432	.69	985
1944	Jan.	37	1.16	43	37	1.16	43
	Feb.	49	1.14	56	49	1.14	56
	March	76	1.06	81	76	1.06	81
	April	204	.62	126	200	.64	129
	May	640	.36	230	631	.37	234
	June	705	.25	176	693	.26	181
	July	283	.35	99	270	.39	104
	Aug.	61	.85	52	48	1.19	57
	Sept.	66	.92	61	56	1.16	65
	Oct.	75	.91	68	75	.91	68
	Nov.	52	1.12	58	52	1.12	58
	Dec.	43	1.19	51	43	1.19	51
	Total	2,291	.48	1,101	2,230	.51	1,127
1945	Jan.	41	1.22	50	41	1.22	50
	Feb.	63	1.13	71	63	1.13	71
	March	72	1.03	74	72	1.03	74
	April	196	.61	120	192	.64	123
	May	456	.35	160	447	.37	164
	June	377	.29	109	365	.31	114
	July	128	.50	64	115	.60	69
	Aug.	96	1.13	108	83	1.36	113
	Sept.	22	1.18	26	12	2.50	30
	Oct.	62	1.10	68	62	1.10	68
	Nov.	46	1.04	48	46	1.04	48
	Dec.	30	1.27	38	30	1.27	38
	Total	1,589	.59	936	1,528	.63	962
1946	Jan.	37	1.14	42	37	1.14	42
	Feb.	36	1.19	43	36	1.19	43
	March	47	1.04	49	47	1.04	49
	April	95	.66	63	91	.73	66
	May	125	.49	61	116	.56	65
	June	204	.40	82	192	.45	87
	July	63	.86	54	50	1.18	59
	Aug.	75	1.12	84	62	1.44	89
	Sept.	44	.93	41	34	1.32	45
	Oct.	55	.98	54	55	.98	54
	Nov.	60	1.02	61	60	1.02	61
	Dec.	46	1.02	47	46	1.02	47
	Total	887	.77	681	826	.86	707
1947	Jan.	31	1.13	[illegible]	31	1.13	35
	Feb.	45	1.07	[illegible]	45	1.07	48
	March	51	.90	[illegible]	51	.90	46
	April	68	.63	[illegible]	64	.72	46
	May	329	.38	[illegible]	320	.40	129
	June	276	.30	[illegible]	264	.33	88
	July	110	.41	45	97	.52	50
	Aug.	294	1.01	296	281	1.07	301
	Sept.	124	.73	91	114	.83	95
	Oct.	207	.79	163	207	.79	163
	Nov.	77	.73	56	77	.73	56
	Dec.	65	.86	56	65	.86	56
	Total	1,677	.65	1,087	1,616	.69	1,113
1948	Jan.	52	.83	43	52	.83	43
	Feb.	79	.84	66	79	.84	66
	March	90	.83	75	90	.83	75
	April	358	.37	133	354	.38	136
	May	519	.27	140	510	.28	144
	June	603	.28	169	591	.29	174
	July	147	.41	60	134	.48	65
	Aug.	86	.78	67	73	.99	72
	Sept.	36	1.11	40	26	1.69	44
	Oct.	75	1.05	79	75	1.05	79
	Nov.	55	1.07	59	55	1.07	59
	Dec.	41	1.12	46	41	1.12	46
	Total	2,141	.46	977	2,080	.48	1,003
1949	Jan.	63	1.11	70	63	1.11	70
	Feb.	74	.99	73	74	.99	73
	March	152	.81	123	152	.81	123
	April	338	.45	152	334	.46	155
	May	503	.31	156	494	.32	160
	June	748	.31	232	736	.32	237
	July	342	.33	113	329	.36	118
	Aug.	90	.66	59	77	.83	64
	Sept.	41	1.05	43	32	1.47	47
	Oct.	56	1.00	56	56	1.00	56
	Nov.	45	1.07	48	45	1.07	48
	Dec.	35	1.23	43	34	1.26	43
	Total	2,487	.47	1,168	2,426	.49	1,194
1950	Jan.	41	1.12	46	41	1.12	46
	Feb.	49	1.08	53	49	1.08	53
	March	56	.93	52	56	.93	52
	April	136	.46	62	132	.49	65
	May	169	.40	68	160	.45	72
	June	191	.38	73	179	.44	78
	July	68	.72	49	55	.98	54
	Aug.	15	1.13	17	2	11.00	22
	Sept.	42	1.14	48	32	1.62	52
	Oct.	30	1.07	32	30	1.07	32
	Nov.	25	1.44	36	25	1.44	36
	Dec.	32	1.34	43	32	1.34	43
	Total	854	.68	579	793	.76	605
1951	Jan.	30	1.30	39	30	1.30	39
	Feb.	29	1.41	41	29	1.41	41
	March	34	1.15	39	34	1.15	39
	April	34	.85	29	30	1.07	32
	May	142	.51	72	133	.57	76
	June	188	.36	68	176	.41	73
	July	30	.80	24	17	1.70	29
	Aug.	49	1.06	52	36	1.58	57
	Sept.	45	1.07	48	35	1.49	52
	Oct.	35	1.23	43	35	1.23	43
	Nov.	39	1.10	43	39	1.10	43
	Dec.	36	1.28	46	36	1.28	46
	Total	691	.79	544	630	.90	570
1952	Jan.	88	1.16	102	88	1.16	102
	Feb.	40	1.20	48	40	1.20	48
	March	87	1.03	90	87	1.03	90
	April	453	.42	190	449	.43	193
	May	618	.30	185	609	.31	189
	June	769	.24	185	757	.25	190
	July	238	.42	100	225	.47	105
	Aug.	83	.69	57	70	.89	62
	Sept.	56	.93	52	46	1.22	56
	Oct.	38	1.05	40	38	1.05	40
	Nov.	41	1.29	53	41	1.29	53
	Dec.	43	1.26	54	43	1.26	54
	Total	2,554	.45	1,156	2,493	.47	1,182

Table 12

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Bluff, Utah

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	42	1.24	52	42	1.24	52
	Feb.	36	1.17	42	36	1.17	42
	March	56	1.02	57	56	1.02	57
	April	107	.64	68	103	.69	71
	May	156	.44	69	147	.50	73
	June	267	.27	72	255	.30	77
1953	July	77	.84	65	64	1.09	70
	Aug.	71	1.15	82	58	1.50	87
	Sept.	12	1.50	18	2	11.00	22
	Oct.	54	1.28	69	54	1.28	69
	Nov.	55	1.13	62	55	1.13	62
	Dec.	35	1.31	46	35	1.31	46
	Total	968	.73	702	907	.80	728
	Jan.	32	1.34	43	32	1.34	43
	Feb.	36	1.17	42	36	1.17	42
	March	48	1.02	49	48	1.02	49
	April	113	.53	60	109	.58	63
	May	218	.39	85	209	.43	89
	June	120	.48	58	108	.58	63
1954	July	120	1.03	123	107	1.20	128
	Aug.	66	.86	57	53	1.17	62
	Sept.	89	1.19	106	79	1.32	104
	Oct.	95	.75	71	95	.75	71
	Nov.	39	1.05	41	39	1.05	41
	Dec.	35	1.26	44	35	1.26	44
	Total	1,011	.77	779	950	.85	805
	Jan.	31	1.26	39	31	1.26	39
	Feb.	34	1.12	38	34	1.12	38
	March	63	1.00	63	63	1.00	63
	April	62	.74	46	58	.84	49
	May	186	.38	71	177	.42	75
	June	208	.32	67	196	.37	72
1955	July	65	.88	57	52	1.19	62
	Aug.	143	1.07	153	130	1.22	158
	Sept.	28	.82	23	18	1.50	27
	Oct.	25	1.00	25	25	1.00	25
	Nov.	31	1.26	39	31	1.26	39
	Dec.	35	1.34	47	35	1.34	47
	Total	911	.73	668	850	.82	694
	Jan.	41	1.22	50	41	1.22	50
	Feb.	34	1.29	44	34	1.29	44
	March	75	.83	62	75	.83	62
	April	107	.50	54	103	.55	57
	May	241	.35	84	232	.38	88
	June	203	.31	63	191	.36	68
1956	July	31	1.10	34	18	2.17	39
	Aug.	36	1.33	48	23	2.30	53
	Sept.	4	1.50	6	0	0	0
	Oct.	13	1.54	20	9	2.22	20
	Nov.	30	1.23	37	30	1.23	37
	Dec.	25	1.40	35	25	1.40	35
	Total	840	.64	537	781	.71	553
	Jan.	38	1.26	48	38	1.26	48
	Feb.	64	1.05	67	64	1.05	67
	March	71	.97	69	71	.97	69
	April	171	.55	94	167	.58	97
	May	327	.48	157	318	.51	161
	June	786	.28	220	774	.29	225
1957	July	566	.38	215	553	.40	220
	Aug.	364	.63	229	351	.67	234
	Sept.	142	.68	97	132	.77	101
	Oct.	150	.86	129	150	.86	129
	Nov.	141	.72	102	141	.72	102
	Dec.	88	.81	71	88	.81	71
	Total	2,908	.51	1,498	2,847	.54	1,524
	Jan.	53	1.02	54	53	1.02	54
	Feb.	119	.92	109	119	.92	109
	March	159	.87	139	159	.87	139
	April	413	.48	198	409	.49	201
	May	743	.26	193	734	.27	197
	June	507	.25	126	495	.26	131
1958	July	74	.65	48	61	.87	53
	Aug.	42	1.02	43	29	1.66	48
	Sept.	61	.95	58	51	1.22	62
	Oct.	47	1.04	49	47	1.04	49
	Nov.	43	1.23	53	43	1.23	53
	Dec.	36	1.28	46	36	1.28	46
	Total	2,297	.49	1,116	2,236	.51	1,142

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	30	1.39	42	30	1.39	42
	Feb.	31	1.36	42	31	1.36	42
	March	32	1.27	41	32	1.27	41
	April	39	.94	37	35	1.14	40
	May	110	.52	57	101	.60	61
	June	156	.39	61	144	.46	66
1959	July	18	.81	15	5	4.00	20
	Aug.	64	1.13	72	51	1.51	77
	Sept.	11	1.53	17	1	21.00	21
	Oct.	92	.86	79	92	.86	79
	Nov.	82	.82	67	82	.82	67
	Dec.	46	1.02	47	46	1.02	47
	Total	711	.81	577	650	.93	603
	Jan.	37	1.26	47	37	1.26	47
	Feb.	43	1.09	47	43	1.09	47
	March	260	.73	190	260	.73	190
	April	336	.32	108	332	.33	111
	May	285	.34	97	276	.37	101
	June	382	.27	103	370	.29	108
1960	July	92	.53	49	79	.68	54
	Aug.	18	1.11	20	5	5.00	25
	Sept.	17	1.24	21	7	3.57	25
	Oct.	58	1.13	66	58	1.13	66
	Nov.	40	1.22	49	40	1.22	49
	Dec.	40	1.27	51	40	1.27	51
	Total	1,608	.53	848	1,547	.56	874
	Jan.	35	1.33	47	35	1.33	47
	Feb.	41	1.31	54	41	1.31	54
	March	66	1.02	67	66	1.02	67
	April	157	.56	88	153	.59	91
	May	285	.32	91	276	.34	95
	June	227	.31	70	215	.35	75
1961	July	43	.83	36	30	1.37	41
	Aug.	87	1.05	91	74	1.30	96
	Sept.	109	.88	96	99	1.01	100
	Oct.	93	.77	75	98	.77	75
	Nov.	72	.93	67	72	.93	67
	Dec.	44	1.22	54	44	1.22	54
	Total	1,264	.66	836	1,203	.72	862
	Jan.	36	1.25	45	36	1.25	45
	Feb.	94	.95	89	94	.95	89
	March	73	.99	72	73	.99	72
	April	315	.37	117	311	.39	120
	May	346	.30	104	337	.32	108
	June	297	.32	95	285	.35	100
1962	July	87	.59	51	74	.76	56
	Aug.	23	1.00	23	10	2.80	28
	Sept.	26	1.42	37	16	2.56	41
	Oct.	104	1.32	137	104	1.32	137
	Nov.	45	1.33	60	45	1.33	60
	Dec.	33	1.39	46	33	1.39	46
	Total	1,479	.59	876	1,418	.64	902
	Jan.	25	1.68	42	25	1.68	42
	Feb.	39	1.44	56	39	1.44	56
	March	40	1.25	50	40	1.25	50
	April	64	.78	50	60	.88	53
	May	95	.72	68	87	.83	72
	June	47	.83	39	36	1.19	43
1963	July	15	1.60	24	3	9.67	29
	Aug.	48	1.56	75	36	2.22	80
	Sept.	70	1.08	76	61	1.31	80
	Oct.	41	1.32	54	41	1.32	54
	Nov.	47	1.11	52	47	1.11	52
	Dec.	48	1.02	49	48	1.02	49
	Total	579	1.10	635	523	1.26	661
	Jan.	44	1.14	50	44	1.14	50
	Feb.	30	1.27	38	30	1.27	38
	March	28	1.46	41	28	1.46	41
	April	30	1.40	42	28	1.50	42
	May	103	.57	59	98	.60	59
	June	121	.58	70	115	.63	72
1964	July	114	.76	87	108	.82	89
	Aug.	131	1.07	140	125	1.13	141
	Sept.	56	1.36	76	54	1.43	77
	Oct.	37	1.27	47	37	1.27	47
	Nov.	42	1.43	60	42	1.43	60
	Dec.	60	1.20	72	60	1.20	72
	Total	796	.98	782	769	1.02	788

Table 12

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Bluff, Utah

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	122	0.77	94	122	0.77	94
	Feb.	120	.70	84	120	.70	84
	March	85	.93	79	85	.93	79
	April	165	.62	102	165	.62	102
	May	288	.45	130	287	.45	130
-1965	June	419	.38	159	418	.38	160
	July	295	.45	133	294	.46	134
	Aug.	218	.65	142	217	.66	143
	Sept.	177	.56	99	176	.57	100
	Oct.	190	.60	114	190	.60	114
	Nov.	232	.50	116	232	.50	116
	Dec.	235	.54	127	235	.54	127
	Total	2,546	.54	1,379	2,541	.54	1,383
	Jan.						
	Feb.						
	March						
	April						
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	July						
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	Sept.						
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	Dec.						
	Total						
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	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	198	0.54	107	198	0.54	107
	Feb.	129	.65	84	129	.65	84
	March	199	.68	135	199	.68	135
	April	252	.48	121	252	.48	121
	May	267	.42	112	267	.42	112
-1966	June	127	.56	71	127	.56	71
	July	54	1.02	55	54	1.02	55
	Aug.	44	1.30	57	44	1.30	57
	Sept.	43	1.26	54	43	1.26	54
	Oct.	95	.66	63	95	.66	63
	Nov.	70	.86	60	70	.86	60
	Dec.	72	1.11	80	72	1.11	80
	Total	1,550	.64	999	1,550	.64	999
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	Nov.						
	Dec.						
	Total						

Table 12

Colorado River Basin
Flow and Quality of Water Data
San Juan River near Bluff, Utah
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)
1941	4,898	0.54	2,624	4,837	0.55	2,650
1942	2,247	.53	1,185	2,191	.55	1,211
1943	1,493	.64	959	1,432	.69	985
1944	2,291	.48	1,101	2,230	.51	1,127
1945	1,589	.59	936	1,528	.63	962
1946	887	.77	681	826	.86	707
1947	1,677	.65	1,087	1,616	.69	1,113
1948	2,141	.46	977	2,080	.48	1,003
1949	2,487	.47	1,168	2,426	.49	1,194
1950	854	.68	579	793	.76	605
1951	691	.79	544	630	.90	570
1952	2,554	.45	1,156	2,493	.47	1,182
1953	968	.73	702	907	.80	728
1954	1,011	.77	779	950	.85	805
1955	911	.73	668	850	.82	694
1956	840	.64	537	781	.71	553
1957	2,908	.51	1,498	2,847	.54	1,524
1958	2,297	.49	1,116	2,236	.51	1,142
1959	711	.81	577	650	.93	603
1960	1,608	.53	848	1,547	.56	874
1961	1,264	.66	836	1,203	.72	862
1962	1,479	.59	876	1,418	.64	902
1963	579	1.10	635	523	1.26	661
1964	796	.98	782	769	1.02	788
1965	2,546	.54	1,379	2,541	.54	1,383
1966	1,550	.64	999	1,550	.64	999
Total	43,278		25,229	41,554		25,827
Average	1,665	0.58	970	1,598	0.62	993

Sampled quality record entire period.
Measured flow record entire period.

Table 13

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Lees Ferry, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	348	1.36	474	324	1.47	476
	Feb.	423	1.29	546	399	1.37	547
	March	668	1.12	749	635	1.18	749
	April	1,091	.79	862	1,048	.83	867
	May	4,974	.45	2,239	4,822	.47	2,254
	June	4,004	.38	1,522	3,773	.41	1,547
	July	1,666	.51	850	1,485	.60	886
	Aug.	798	1.16	925	668	1.44	962
	Sept.	608	1.35	821	524	1.62	850
	Oct.	1,797	1.09	1,959	1,777	1.11	1,976
	Nov.	903	.94	849	888	.97	863
	Dec.	576	1.19	685	561	1.24	697
	Total	17,856	.70	12,481	16,904	.75	12,674
1942	Jan.	407	1.34	545	378	1.44	546
	Feb.	396	1.28	507	368	1.38	508
	March	630	1.16	731	591	1.24	731
	April	2,844	.55	1,564	2,798	.56	1,569
	May	3,209	.46	1,476	3,054	.49	1,490
	June	4,202	.29	1,219	3,955	.31	1,241
	July	1,317	.57	751	1,123	.70	783
	Aug.	454	1.08	490	320	1.63	523
	Sept.	275	1.59	438	187	2.49	465
	Oct.	334	1.58	528	309	1.75	542
	Nov.	368	1.58	582	347	1.71	595
	Dec.	357	1.54	550	338	1.66	561
	Total	14,793	.63	9,381	13,768	.69	9,554
1943	Jan.	330	1.50	494	305	1.62	495
	Feb.	332	1.41	469	308	1.53	470
	March	516	1.19	614	483	1.27	614
	April	1,450	.67	971	1,407	.69	975
	May	2,158	.43	928	2,021	.46	939
	June	2,729	.40	1,092	2,514	.44	1,110
	July	1,429	.47	672	1,260	.55	699
	Aug.	793	1.09	864	674	1.32	892
	Sept.	448	1.15	514	368	1.46	536
	Oct.	378	1.60	604	353	1.74	616
	Nov.	456	1.35	616	436	1.44	626
	Dec.	395	1.36	537	378	1.44	546
	Total	11,414	.73	8,375	10,507	.81	8,518
1944	Jan.	278	1.50	418	255	1.65	420
	Feb.	344	1.32	454	321	1.42	455
	March	509	1.31	668	477	1.40	668
	April	1,027	.89	914	985	.93	919
	May	3,251	.47	1,528	3,108	.50	1,542
	June	4,136	.32	1,323	3,922	.34	1,347
	July	1,782	.45	802	1,612	.52	835
	Aug.	417	1.07	446	294	1.63	480
	Sept.	229	1.50	343	146	2.54	371
	Oct.	342	1.66	567	323	1.80	582
	Nov.	384	1.51	579	369	1.60	592
	Dec.	320	1.51	483	306	1.61	494
	Total	13,019	.66	8,525	12,118	.72	8,705
1945	Jan.	325	1.48	481	300	1.61	482
	Feb.	351	1.39	489	327	1.50	490
	March	437	1.28	559	404	1.38	559
	April	755	.99	748	713	1.05	752
	May	2,805	.44	1,234	2,669	.47	1,245
	June	2,761	.37	1,021	2,551	.41	1,040
	July	1,668	.47	784	1,501	.54	812
	Aug.	1,011	.89	900	892	1.04	928
	Sept.	370	1.28	474	290	1.71	496
	Oct.	505	1.51	763	480	1.62	776
	Nov.	443	1.34	594	424	1.42	604
	Dec.	337	1.35	454	320	1.45	463
	Total	11,768	.72	8,501	10,871	.80	8,647
1946	Jan.	366	1.28	468	344	1.36	469
	Feb.	319	1.24	396	298	1.33	397
	March	496	1.15	570	466	1.22	570
	April	1,013	.83	841	974	.87	845
	May	1,732	.47	814	1,602	.52	826
	June	1,993	.43	857	1,800	.49	878
	July	730	.73	533	572	.98	561
	Aug.	478	1.28	612	366	1.75	642
	Sept.	310	1.62	502	235	2.23	525
	Oct.	403	1.50	604	382	1.62	617
	Nov.	466	1.30	607	451	1.37	617
	Dec.	445	1.22	542	431	1.28	552
	Total	8,751	.84	7,346	7,921	.95	7,499
1947	Jan.	277	1.40	388	247	1.57	389
	Feb.	357	1.29	462	328	1.41	463
	March	654	1.09	713	614	1.16	713
	April	780	.78	608	731	.84	612
	May	3,121	.39	1,217	2,966	.41	1,226
	June	3,275	.40	1,310	3,023	.44	1,327
	July	1,926	.43	828	1,729	.49	852
	Aug.	1,203	.98	1,179	1,069	1.13	1,205
	Sept.	584	1.13	660	500	1.36	682
	Oct.	818	1.17	958	789	1.23	969
	Nov.	585	1.07	626	560	1.13	635
	Dec.	466	1.21	564	444	1.29	573
	Total	14,046	.68	9,513	13,000	.74	9,646
1948	Jan.	406	1.18	479	381	1.26	480
	Feb.	458	1.14	522	434	1.20	522
	March	645	1.14	735	611	1.20	735
	April	1,703	.64	1,090	1,660	.66	1,094
	May	3,507	.38	1,333	3,385	.40	1,342
	June	3,339	.34	1,135	3,147	.36	1,147
	July	980	.65	637	824	.79	655
	Aug.	531	1.23	653	420	1.60	673
	Sept.	230	1.40	322	156	2.17	339
	Oct.	331	1.65	545	301	1.84	553
	Nov.	408	1.46	595	382	1.58	602
	Dec.	347	1.40	485	324	1.51	490
	Total	12,885	.66	8,531	12,025	.72	8,632
1949	Jan.	337	1.39	469	307	1.53	469
	Feb.	361	1.25	451	332	1.36	451
	March	706	1.18	834	669	1.25	834
	April	1,307	.78	1,020	1,260	.81	1,022
	May	3,098	.43	1,332	2,963	.45	1,338
	June	4,419	.41	1,812	4,196	.43	1,819
	July	2,137	.52	1,111	1,961	.57	1,124
	Aug.	576	1.00	576	462	1.28	592
	Sept.	313	1.51	473	238	2.04	486
	Oct.	509	1.48	753	476	1.59	757
	Nov.	473	1.31	619	446	1.40	623
	Dec.	368	1.37	504	342	1.48	508
	Total	14,604	.68	9,954	13,652	.73	10,023
1950	Jan.	350	1.41	493	334	1.48	494
	Feb.	398	1.23	490	382	1.28	490
	March	650	1.11	721	629	1.15	722
	April	1,217	.74	900	1,182	.80	905
	May	1,971	.49	966	1,865	.52	973
	June	2,979	.37	1,102	2,832	.39	1,117
	July	1,377	.67	923	1,253	.75	941
	Aug.	422	1.02	430	333	1.34	447
	Sept.	330	1.47	485	268	1.87	501
	Oct.	342	1.47	502	324	1.57	509
	Nov.	350	1.55	542	336	1.63	548
	Dec.	415	1.31	544	405	1.36	549
	Total	10,801	.75	8,098	10,143	.81	8,196
1951	Jan.	315	1.43	451	298	1.52	452
	Feb.	361	1.25	451	344	1.31	451
	March	417	1.19	497	393	1.27	498
	April	531	1.00	531	495	1.08	536
	May	1,645	.57	938	1,542	.61	945
	June	2,886	.41	1,184	2,740	.44	1,197
	July	1,357	.48	651	1,237	.54	668
	Aug.	787	1.11	874	697	1.28	892
	Sept.	411	1.32	542	350	1.59	558
	Oct.	412	1.47	606	391	1.57	613
	Nov.	445	1.41	628	429	1.48	634
	Dec.	333	1.44	480	320	1.52	486
	Total	9,900	.79	7,833	9,236	.86	7,930
1952	Jan.	476	1.23	586	454	1.29	586
	Feb.	379	1.26	478	358	1.34	478
	March	440	1.31	576	413	1.39	576
	April	2,267	.74	1,677	2,226	.76	1,681
	May	5,081	.41	2,083	4,968	.42	2,089
	June	5,192	.36	1,869	5,025	.37	1,880
	July	1,573	.55	865	1,443	.61	881
	Aug.	821	1.06	870	728	1.22	887
	Sept.	542	1.31	710	479	1.51	725
	Oct.	369	1.43	527	339	1.57	532
	Nov.	386	1.55	599	363	1.66	604
	Dec.	378	1.47	556	358	1.56	560
	Total	17,904	.64	11,396	17,154	.67	11,479

Table 13

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Lees Ferry, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	394	1.36	536	377	1.42	536
	Feb.	365	1.30	475	349	1.36	475
	March	458	1.22	558	437	1.28	559
	April	529	1.07	566	495	1.15	571
	May	1,047	.69	723	959	.76	730
	June	2,992	.38	1,137	2,870	.40	1,148
-1953	July	950	.64	608	845	.74	623
	Aug.	661	1.19	787	583	1.38	804
	Sept.	258	1.59	410	201	2.11	424
	Oct.	321	1.77	568	299	1.92	573
	Nov.	414	1.50	621	398	1.57	626
	Dec.	341	1.46	498	329	1.53	502
	Total	8,730	.86	7,487	8,142	.93	7,571
	Jan.	318	1.46	465	303	1.53	465
	Feb.	342	1.30	444	328	1.35	444
	March	393	1.24	487	375	1.30	488
	April	546	1.00	546	517	1.07	551
	May	1,277	.56	715	1,204	.60	723
	June	792	.63	499	693	.74	512
-1954	July	647	.87	563	554	1.05	580
	Aug.	321	1.19	382	248	1.61	399
	Sept.	389	1.66	645	336	1.96	659
	Oct.	512	1.43	733	494	1.49	738
	Nov.	349	1.39	485	336	1.46	490
	Dec.	278	1.51	421	267	1.60	426
	Total	6,164	1.04	6,385	5,655	1.15	6,475
	Jan.	244	1.58	386	229	1.68	386
	Feb.	243	1.39	338	229	1.48	338
	March	580	1.29	748	561	1.33	748
	April	617	1.05	649	587	1.11	653
	May	1,570	.56	879	1,500	.59	887
	June	1,586	.49	777	1,487	.53	787
-1955	July	571	.70	399	481	.86	412
	Aug.	510	1.40	713	439	1.66	728
	Sept.	230	1.60	368	176	2.15	379
	Oct.	214	1.70	363	194	1.89	367
	Nov.	275	1.67	458	262	1.76	461
	Dec.	326	1.44	470	312	1.51	472
	Total	6,966	.94	6,548	6,457	1.02	6,618
	Jan.	373	1.28	477	358	1.33	477
	Feb.	280	1.39	390	266	1.47	390
	March	511	1.16	592	492	1.20	592
	April	898	.75	673	868	.78	677
	May	2,190	.48	1,051	2,115	.50	1,057
	June	2,594	.39	1,012	2,482	.41	1,021
-1956	July	557	.75	418	471	.91	430
	Aug.	356	1.33	473	288	1.68	485
	Sept.	166	1.48	246	116	2.19	254
	Oct.	187	1.74	325	168	1.94	326
	Nov.	300	1.58	474	286	1.66	475
	Dec.	247	1.55	383	235	1.63	384
	Total	8,659	.75	6,514	8,145	.81	6,568
	Jan.	284	1.46	415	270	1.54	416
	Feb.	323	1.34	433	309	1.40	433
	March	499	1.23	613	481	1.28	614
	April	828	.90	745	799	.94	750
	May	2,569	.56	1,439	2,497	.58	1,447
	June	5,645	.39	2,201	5,550	.40	2,215
-1957	July	4,015	.43	1,727	3,922	.44	1,744
	Aug.	1,604	.78	1,251	1,528	.83	1,268
	Sept.	822	1.03	847	767	1.12	861
	Oct.	748	1.54	1,150	730	1.58	1,156
	Nov.	848	1.39	1,179	835	1.42	1,184
	Dec.	517	1.25	646	506	1.29	651
	Total	18,702	.68	12,646	18,194	.70	12,739
	Jan.	397	1.27	504	383	1.32	504
	Feb.	536	1.18	632	523	1.21	632
	March	696	1.10	766	677	1.13	766
	April	1,574	.64	1,007	1,545	.65	1,011
	May	3,992	.46	1,836	3,926	.47	1,843
	June	3,678	.40	1,471	3,594	.41	1,483
-1958	July	628	.74	465	545	.88	480
	Aug.	286	1.43	409	217	1.95	424
	Sept.	320	1.69	540	269	2.05	552
	Oct.	311	1.62	505	290	1.76	509
	Nov.	357	1.65	589	342	1.73	592
	Dec.	366	1.52	556	353	1.58	558
	Total	13,141	.71	9,280	12,664	.74	9,354

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	315	1.48	466	302	1.54	466
	Feb.	315	1.36	[illegible]	303	1.41	428
	March	344	1.37	471	327	1.44	471
	April	420	1.16	[illegible]	392	1.25	491
	May	1,025	.70	[illegible]	974	.74	723
	June	1,836	.48	[illegible]	1,772	.50	887
-1959	July	782	.63	[illegible]	715	.70	499
	Aug.	425	1.43	608	366	1.68	615
	Sept.	246	1.68	413	199	2.11	419
	Oct.	502	1.41	708	477	1.48	708
	Nov.	499	1.21	604	481	1.26	604
	Dec.	352	1.39	489	337	1.45	489
	Total	7,061	.96	6,766	6,645	1.02	6,800
	Jan.	305	1.54	470	292	1.61	470
	Feb.	318	1.34	426	306	1.39	426
	March	745	1.18	879	728	1.21	879
	April	1,610	.62	998	1,582	.63	1,002
	May	1,564	.51	798	1,513	.53	803
	June	2,239	.43	963	2,175	.45	969
-1960	July	647	.69	446	580	.78	452
	Aug.	208	1.38	287	149	1.97	294
	Sept.	193	1.90	367	146	2.55	373
	Oct.	341	1.67	569	316	1.80	569
	Nov.	345	1.47	507	327	1.55	507
	Dec.	275	1.39	382	260	1.47	382
	Total	8,790	.81	7,092	8,374	.85	7,126
	Jan.	266	1.48	394	253	1.56	394
	Feb.	331	1.34	444	319	1.39	444
	March	362	1.34	485	345	1.41	485
	April	567	1.02	578	539	1.08	582
	May	1,153	.59	680	1,102	.62	685
	June	1,588	.45	715	1,524	.47	721
-1961	July	369	.89	328	302	1.11	334
	Aug.	337	1.65	556	278	2.03	563
	Sept.	711	1.61	1,145	664	1.73	1,151
	Oct.	725	1.01	732	700	1.05	732
	Nov.	527	1.04	548	509	1.08	548
	Dec.	380	1.22	464	365	1.27	464
	Total	7,316	.97	7,069	6,900	1.03	7,103
	Jan.	349	1.24	433	336	1.29	433
	Feb.	791	1.03	815	779	1.05	815
	March	598	1.13	676	581	1.16	676
	April	2,391	.71	1,698	2,365	.72	1,702
	May	3,633	.44	1,599	3,584	.45	1,604
	June	2,876	.45	1,294	2,814	.46	1,300
-1962	July	1,717	.57	979	1,652	.60	985
	Aug.	469	1.02	478	412	1.18	485
	Sept.	315	1.61	507	270	1.90	512
	Oct.	539	1.52	819	516	1.59	819
	Nov.	428	1.28	548	412	1.33	548
	Dec.	333	1.42	473	319	1.48	473
	Total	14,439	.71	10,319	14,040	.74	10,352
	Jan.	169	1.69	286	157	1.82	286
	Feb.	369	1.35	498	358	1.39	498
	March	188	1.35	254	172	1.48	254
	April	60	1.43	86	39	2.20	86
	May	62	1.31	81	23	3.65	84
	June	140	1.13	158	95	1.71	162
-1963	July	90	.96	86	44	2.04	90
	Aug.	62	.97	60	22	2.95	65
	Sept.	60	.90	54	29	2.00	58
	Oct.	61	.89	54	43	1.26	54
	Nov.	60	.95	57	46	1.24	57
	Dec.	63	1.33	84	51	1.68	84
	Total	1,384	1.27	1,758	1,079	1.65	1,778
	Jan.	71	1.32	94	61	1.54	94
	Feb.	231	1.33	307	222	1.38	307
	March	388	1.29	500	374	1.34	500
	April	771	1.24	956	752	1.27	956
	May	319	1.22	389	291	1.34	390
	June	60	1.23	74	32	2.34	75
-1964	July	60	1.25	75	31	2.45	76
	Aug.	174	1.24	216	150	1.45	218
	Sept.	156	.69	108	139	.78	109
	Oct.	268	.63	169	258	.66	169
	Nov.	348	.84	292	340	.86	292
	Dec.	398	1.00	308	392	1.02	308
	Total	3,244	1.10	3,578	3,042	1.18	3,584

Table 13

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Lees Ferry, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	558	0.98	547	554	0.99	547
	Feb.	515	1.02	525	512	1.02	525
	March	556	1.01	562	550	1.02	562
	April	1,222	1.03	1,259	1,214	1.04	1,259
	May	2,284	.95	2,170	2,269	.96	2,170
	June	2,323	.88	2,044	2,308	.89	2,045
-1965	July	727	.48	349	719	.49	350
	Aug.	871	.41	357	868	.41	358
	Sept.	750	.40	300	747	.40	301
	Oct.	659	.43	283	659	.43	283
	Nov.	589	.47	277	589	.47	277
	Dec.	531	.63	335	531	.63	335
	Total	11,585	.78	9,008	11,520	.78	9,012
	Jan.						
	Feb.						
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	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	451	0.73	329	451	0.73	329
	Feb.	483	.76	367	483	.76	367
	March	622	.76	473	622	.76	473
	April	825	.77	635	825	.77	635
	May	978	.72	704	978	.72	704
	June	754	.71	535	754	.71	535
-1966	July	658	.66	434	658	.66	434
	Aug.	682	.65	443	682	.65	443
	Sept.	622	.66	411	622	.66	411
	Oct.	551	.65	358	551	.65	358
	Nov.	584	.66	385	584	.66	385
	Dec.	529	.69	365	529	.69	365
	Total	7,739	.70	5,439	7,739	.70	5,439
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	Dec.						
	Total						

Table 13

Colorado River Basin
Flow and Quality of Water Data
Colorado River at Lees Ferry, Arizona
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)
1941	17,856	0.70	12,481	16,904	0.75	12,674
1942	14,793	.63	9,381	13,768	.69	9,554
1943	11,414	.73	8,375	10,507	.81	8,518
1944	13,019	.66	8,525	12,118	.72	8,705
1945	11,768	.72	8,501	10,871	.80	8,647
1946	8,751	.84	7,346	7,921	.95	7,499
1947	14,046	.68	9,513	13,000	.74	9,646
1948	12,885	.66	8,531	12,025	.72	8,632
1949	14,604	.68	9,954	13,652	.73	10,023
1950	10,801	.75	8,098	10,143	.81	8,196
1951	9,900	.79	7,833	9,236	.86	7,930
1952	17,904	.64	11,396	17,154	.67	11,479
1953	8,730	.86	7,487	8,142	.93	7,571
1954	6,164	1.04	6,385	5,655	1.15	6,475
1955	6,966	.94	6,548	6,457	1.02	6,618
1956	8,659	.75	6,514	8,145	.81	6,568
1957	18,702	.68	12,646	18,194	.70	18,739
1958	13,141	.71	9,280	12,664	.74	9,354
1959	7,061	.96	6,766	6,645	1.02	6,800
1960	8,790	.81	7,092	8,374	.85	7,126
1961	7,316	.97	7,069	6,900	1.03	7,103
1962	14,439	.71	10,319	14,040	.74	10,352
1963	1,384	1.27	1,758	1,079	1.65	1,778
1964	3,244	1.10	3,578	3,042	1.18	3,584
1965	11,585	.78	9,008	11,520	.78	9,012
1966	7,739	.70	5,439	7,739	.70	5,439
Total	281,661		209,823	215,895		212,022
Average	10,833	0.74	8,070	10,227	0.80	8,155

Sampled quality record November 1942 to October 1945, October 1947 to December 1966; remainder by correlation.
Measured flow record entire period.

Table 14

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Grand Canyon, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
-1941	Jan.	434	1.42	616	410	1.51	618
	Feb.	515	1.31	675	491	1.38	676
	March	838	1.17	980	805	1.22	980
	April	1,209	.87	1,052	1,166	.91	1,057
	May	4,976	.50	2,488	4,824	.52	2,503
	June	4,100	.45	1,845	3,869	.48	1,870
	July	1,753	.55	964	1,572	.64	1,000
	Aug.	861	1.29	1,111	731	1.57	1,148
	Sept.	659	1.43	942	575	1.69	971
	Oct.	1,904	1.14	2,171	1,884	1.16	2,188
	Nov.	953	.98	934	938	1.01	948
	Dec.	594	1.22	725	579	1.27	737
	Total	18,796	.77	14,503	17,844	.82	14,696
-1942	Jan.	430	1.40	602	401	1.50	603
	Feb.	435	1.33	579	407	1.43	580
	March	653	1.25	816	614	1.33	816
	April	2,763	.60	1,658	2,717	.61	1,663
	May	3,163	.49	1,550	3,008	.52	1,564
	June	4,241	.32	1,357	3,994	.35	1,379
	July	1,345	.59	794	1,151	.72	826
	Aug.	486	1.15	559	352	1.68	592
	Sept.	294	1.67	491	206	2.51	518
	Oct.	356	1.67	575	331	1.78	589
	Nov.	386	1.67	645	365	1.80	658
	Dec.	373	1/ 1.50	560	354	1.61	571
	Total	14,925	.68	10,186	13,900	.75	10,359
-1943	Jan.	347	1/ 1.49	517	322	1.61	518
	Feb.	351	1/ 1.48	519	327	1.59	520
	March	580	1/ 1.26	731	547	1.34	731
	April	1,417	1/ .83	1,176	1,374	.86	1,180
	May	2,161	1/ .57	1,232	2,024	.61	1,243
	June	2,676	1/ .49	1,311	2,461	.54	1,329
	July	1,459	1/ .60	875	1,290	.70	902
	Aug.	834	1/ 1.17	976	715	1.40	1,004
	Sept.	494	1/ 1.40	692	414	1.72	714
	Oct.	408	1.69	690	383	1.83	702
	Nov.	477	1.47	701	457	1.56	711
	Dec.	420	1.46	613	403	1.54	622
	Total	11,624	.86	10,033	10,717	.95	10,176
-1944	Jan.	298	1.61	480	275	1.75	482
	Feb.	363	1.23	446	340	1.31	447
	March	551	1.41	777	519	1.50	777
	April	1,099	.95	1,044	1,057	.99	1,049
	May	3,206	.55	1,763	3,063	.58	1,777
	June	4,144	.41	1,699	3,930	.44	1,723
	July	1,854	.52	964	1,684	.59	997
	Aug.	456	1.14	520	333	1.66	554
	Sept.	251	1.61	404	168	2.57	432
	Oct.	362	1.78	644	343	1.92	659
	Nov.	401	1.64	658	386	1.74	671
	Dec.	345	1.59	549	331	1.69	560
	Total	13,330	.75	9,948	12,429	.81	10,128
-1945	Jan.	356	1.55	552	331	1.67	553
	Feb.	381	1.48	564	357	1.58	565
	March	472	1.41	666	439	1.52	666
	April	804	1.01	812	762	1.07	816
	May	2,803	.52	1,458	2,667	.55	1,469
	June	2,754	.48	1,322	2,544	.53	1,341
	July	1,732	.56	970	1,565	.64	998
	Aug.	1,071	1.05	1,125	952	1.21	1,153
	Sept.	394	1.38	544	314	1.80	566
	Oct.	524	1.63	854	499	1.74	867
	Nov.	465	1.51	702	446	1.60	712
	Dec.	359	1.47	528	342	1.57	537
	Total	12,115	.83	10,097	11,218	.91	10,243
-1946	Jan.	384	1.41	541	362	1.50	542
	Feb.	333	1.38	460	312	1.48	461
	March	514	1.29	663	484	1.37	663
	April	1,016	.94	955	977	.98	959
	May	1,775	.53	941	1,645	.58	953
	June	1,995	.54	1,077	1,802	.61	1,098
	July	784	.82	643	626	1.07	671
	Aug.	567	1.50	850	455	1.93	880
	Sept.	372	1.71	636	297	2.22	659
	Oct.	419	1.62	679	398	1.74	692
	Nov.	492	1.36	684	477	1.45	694
	Dec.	468	1.31	613	454	1.37	623
	Total	9,119	.96	8,742	8,289	1.07	8,895

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
-1947	Jan.	303	1.50	455	273	1.67	456
	Feb.	371	1.38	512	342	1.50	513
	March	653	1.18	771	613	1.26	771
	April	785	.92	722	736	.99	726
	May	3,088	.48	1,4[illegible]2	2,933	.51	1,491
	June	3,233	.48	1,552	2,981	.53	1,569
	July	1,953	.50	976	1,756	.57	1,000
	Aug.	1,329	1.17	1,555	1,195	1.32	1,581
	Sept.	640	1.26	806	556	1.49	828
	Oct.	894	1.28	1,144	865	1.34	1,155
	Nov.	608	1.14	693	583	1.20	702
	Dec.	490	1.28	627	468	1.36	636
	Total	14,347	.79	11,295	13,301	.86	11,428
-1948	Jan.	427	1.27	542	402	1.35	543
	Feb.	458	1.28	586	434	1.35	586
	March	669	1.25	836	635	1.32	836
	April	1,732	.74	1,282	1,689	.76	1,286
	May	3,392	.45	1,526	3,270	.47	1,535
	June	3,358	.40	1,343	3,166	.43	1,355
	July	1,009	.73	737	853	.89	755
	Aug.	587	1.33	781	476	1.68	801
	Sept.	242	1.65	399	168	2.48	416
	Oct.	336	1.82	612	306	2.03	620
	Nov.	434	1.61	699	408	1.73	706
	Dec.	365	1.25	456	342	1.35	461
	Total	13,009	.75	9,799	12,149	.81	9,900
-1949	Jan.	363	1.51	548	333	1.65	548
	Feb.	374	1.36	509	345	1.48	509
	March	796	1.20	955	759	1.26	955
	April	1,337	.92	1,230	1,290	.96	1,232
	May	2,959	.48	1,420	2,824	.50	1,426
	June	4,303	.48	2,065	4,080	.51	2,072
	July	2,128	.58	1,234	1,952	.64	1,247
	Aug.	632	1.12	708	518	1.40	724
	Sept.	340	1.65	561	265	2.17	574
	Oct.	521	1.58	823	488	1.69	827
	Nov.	488	1.36	664	461	1.45	668
	Dec.	381	1.41	537	355	1.52	541
	Total	14,622	.77	11,254	13,670	.83	11,323
-1950	Jan.	358	1.56	558	342	1.63	559
	Feb.	414	1.35	559	398	1.40	559
	March	670	1.21	811	649	1.25	812
	April	1,192	.88	1,049	1,157	.91	1,054
	May	1,941	.59	1,145	1,835	.63	1,152
	June	2,925	.47	1,375	2,778	.50	1,390
	July	1,401	.76	1,065	1,277	.85	1,083
	Aug.	444	1.13	502	355	1.46	519
	Sept.	343	1.56	535	281	1.96	551
	Oct.	359	1.67	600	341	1.78	607
	Nov.	355	1.75	621	341	1.84	627
	Dec.	434	1.48	642	424	1.53	647
	Total	10,836	.87	9,462	10,178	.94	9,560
-1951	Jan.	326	1.59	518	309	1.68	519
	Feb.	366	1.45	531	349	1.52	531
	March	429	1.35	579	405	1.43	580
	April	535	1.17	626	499	1.26	631
	May	1,552	.67	1,040	1,449	.72	1,047
	June	2,800	.49	1,372	2,654	.52	1,385
	July	1,397	.57	796	1,277	.64	813
	Aug.	833	1.18	983	743	1.35	1,001
	Sept.	452	1.46	660	391	1.73	676
	Oct.	425	1.67	710	404	1.77	717
	Nov.	466	1.61	750	450	1.68	756
	Dec.	353	1.61	568	340	1.69	574
	Total	9,934	.92	9,133	9,270	1.00	9,230
-1952	Jan.	593	1.28	759	571	1.33	759
	Feb.	396	1.42	562	375	1.50	562
	March	435	1.46	635	408	1.56	635
	April	2,209	.84	1,855	2,168	.86	1,859
	May	5,062	.52	2,632	4,949	.53	2,638
	June	5,203	.46	2,393	5,036	.48	2,404
	July	1,590	.65	1,033	1,460	.72	1,049
	Aug.	833	1.18	983	740	1.35	1,000
	Sept.	596	1.43	852	533	1.63	867
	Oct.	393	1.52	597	363	1.66	602
	Nov.	396	1.64	649	373	1.75	654
	Dec.	400	1.58	632	380	1.67	636
	Total	18,806	.75	13,582	17,356	.79	13,665

Table 14

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Grand Canyon, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	408	1.46	596	391	1.52	596
	Feb.	378	1.42	537	362	1.48	537
	March	478	1.35	645	457	1.41	646
	April	533	1.21	645	499	1.30	650
	May	989	.87	860	901	.96	867
	June	2,932	.47	1,378	2,810	.49	1,389
	July	980	.76	745	875	.87	760
	Aug.	703	1.30	914	625	1.49	931
	Sept.	290	1.73	502	233	2.21	516
	Oct.	325	1.88	611	303	2.03	616
	Nov.	428	1.63	698	412	1.71	703
	Dec.	360	1.56	562	348	1.63	566
	Total	8,804	.99	8,693	8,216	1.07	8,777
1954	Jan.	333	1.58	526	318	1.65	526
	Feb.	353	1.40	494	339	1.46	494
	March	424	1.34	568	406	1.40	569
	April	566	1.11	628	537	1.18	633
	May	1,211	.68	823	1,138	.73	831
	June	798	.68	543	699	.80	556
	July	669	.95	636	576	1.13	653
	Aug.	349	1.32	461	276	1.73	478
	Sept.	415	1.67	693	362	1.95	707
	Oct.	526	1.52	800	508	1.58	805
	Nov.	360	1.47	529	347	1.54	534
	Dec.	296	1.60	474	285	1.68	479
	Total	6,300	1.14	7,175	5,791	1.25	7,265
1955	Jan.	261	1.70	444	246	1.80	444
	Feb.	269	1.50	404	255	1.58	404
	March	586	1.35	791	567	1.40	791
	April	621	1.15	714	591	1.21	718
	May	1,515	.59	894	1,445	.62	902
	June	1,596	.55	878	1,497	.59	888
	July	618	.77	476	528	.93	489
	Aug.	668	1.39	929	597	1.58	944
	Sept.	265	1.63	432	211	2.10	443
	Oct.	236	1.84	434	216	2.03	438
	Nov.	298	1/1.88	560	285	1.98	563
	Dec.	354	1/1.52	538	340	1.59	540
	Total	7,287	1.03	7,494	6,778	1.12	7,564
1956	Jan.	398	1/1.42	565	383	1.48	565
	Feb.	310	1.30	403	296	1.36	403
	March	511	1.21	618	492	1.26	618
	April	878	.82	720	848	.85	724
	May	2,125	.49	1,041	2,050	.51	1,047
	June	2,584	.45	1,163	2,472	.47	1,172
	July	598	.82	490	512	.98	502
	Aug.	383	1.31	502	315	1.63	514
	Sept.	185	1.58	292	135	2.22	300
	Oct.	202	1.86	376	183	2.06	377
	Nov.	325	1.69	549	311	1.77	550
	Dec.	274	1.66	455	262	1.74	456
	Total	8,773	.82	7,174	8,259	.88	7,228
1957	Jan.	343	1.45	497	329	1.51	498
	Feb.	370	1.37	507	356	1.42	507
	March	541	1.26	682	523	1.31	683
	April	812	.93	755	783	.97	760
	May	2,501	.57	1,426	2,429	.59	1,434
	June	5,541	.40	2,216	5,446	.41	2,230
	July	4,033	.40	1,613	3,940	.41	1,630
	Aug.	1,672	.88	1,471	1,596	.93	1,488
	Sept.	884	1.13	999	829	1.22	1,013
	Oct.	784	1.46	1,144	766	1.50	1,150
	Nov.	892	1.42	1,266	879	1.45	1,271
	Dec.	537	1.28	687	526	1.32	692
	Total	18,910	.70	13,263	18,402	.73	13,356
1958	Jan.	415	1.31	544	401	1.36	544
	Feb.	536	1.24	665	523	1.27	665
	March	749	1.13	846	730	1.16	846
	April	1,580	.77	1,220	1,551	.79	1,224
	May	3,900	.45	1,755	3,834	.46	1,762
	June	3,763	.41	1,542	3,679	.42	1,554
	July	683	.91	622	600	1.06	637
	Aug.	337	1/1.31	440	268	1.70	455
	Sept.	379	1/1.32	500	328	1.56	512
	Oct.	346	1/1.53	530	325	1.64	534
	Nov.	385	1/1.53	590	370	1.60	593
	Dec.	388	1/1.55	600	375	1.61	602
	Total	13,461	.73	9,854	12,984	.76	9,928
1959	Jan.	334	1/1.56	[illegible]	321	1.62	520
	Feb.	326	1/1.53	[illegible]	314	1.59	500
	March	365	1/1.53	[illegible]	348	1.61	560
	April	423	1.27	[illegible]	395	1.37	541
	May	1,011	.78	[illegible]	960	.83	794
	June	1,804	.53	[illegible]	1,740	.55	962
	July	795	.69	[illegible]	728	.76	555
	Aug.	488	1.50	731	429	1.72	738
	Sept.	271	1.82	493	224	2.23	499
	Oct.	528	1.47	777	503	1.54	777
	Nov.	569	1.25	712	551	1.29	712
	Dec.	394	1.33	524	379	1.38	524
	Total	7,308	1.05	7,648	6,892	1.11	7,682
1960	Jan.	348	1.41	490	335	1.46	490
	Feb.	353	1.40	495	341	1.45	495
	March	820	1.15	942	803	1.17	942
	April	1,650	.63	1,036	1,622	.64	1,040
	May	1,580	.55	870	1,529	.57	875
	June	2,212	.46	1,011	2,148	.47	1,017
	July	678	.73	497	611	.82	503
	Aug.	233	1.42	331	174	1.94	338
	Sept.	218	1.92	418	171	2.48	424
	Oct.	382	1.81	692	357	1.94	692
	Nov.	380	1.59	603	362	1.67	603
	Dec.	300	1.49	448	285	1.57	448
	Total	9,154	.86	7,833	8,738	.90	7,867
1961	Jan.	291	1.58	460	278	1.65	460
	Feb.	353	1.39	490	341	1.44	490
	March	379	1.40	530	362	1.46	530
	April	587	1.04	608	559	1.09	612
	May	1,147	.66	760	1,096	.70	765
	June	1,692	.47	788	1,628	.49	794
	July	417	.98	409	350	1.19	415
	Aug.	374	1.76	658	315	2.11	665
	Sept.	748	1.82	1,360	701	1.95	1,366
	Oct.	772	1.23	949	747	1.27	949
	Nov.	570	1.23	701	552	1.27	701
	Dec.	409	1.32	539	394	1.37	539
	Total	7,739	1.07	8,252	7,323	1.13	8,286
1962	Jan.	369	1.35	498	356	1.40	498
	Feb.	832	1.02	847	820	1.03	847
	March	610	1.19	726	593	1.22	726
	April	2,467	.70	1,730	2,441	.71	1,734
	May	3,716	.45	1,654	3,667	.45	1,659
	June	2,850	.46	1,318	2,788	.47	1,324
	July	1,821	.57	1,031	1,756	.59	1,037
	Aug.	512	1.03	526	455	1.17	533
	Sept.	318	1.58	502	273	1.86	507
	Oct.	557	1.57	877	534	1.64	877
	Nov.	443	1.34	592	427	1.39	592
	Dec.	344	1.50	516	330	1.56	516
	Total	14,839	.73	10,817	14,440	.75	10,850
1963	Jan.	182	1.84	334	170	1.96	334
	Feb.	374	1.33	496	363	1.37	496
	March	203	1.37	279	187	1.49	279
	April	72	1.56	112	51	2.20	112
	May	79	1.49	118	40	3.02	121
	June	148	1.09	162	103	1.61	166
	July	108	1.14	123	62	2.05	127
	Aug.	112	1.29	145	72	2.08	150
	Sept.	122	1.43	175	91	1.97	179
	Oct.	77	1.39	107	59	1.81	107
	Nov.	76	1.39	106	62	1.71	106
	Dec.	77	1.74	134	65	2.06	134
	Total	1,630	1.41	2,291	1,325	1.74	2,311
1964	Jan.	79	1.75	138	69	2.00	138
	Feb.	245	1.52	373	236	1.58	373
	March	382	1.47	562	368	1.53	562
	April	796	1.33	1,058	777	1.36	1,058
	May	356	1.36	485	328	1.48	486
	June	77	1.65	127	49	2.61	128
	July	84	1.75	147	55	2.69	148
	Aug.	287	1.31	376	263	1.44	378
	Sept.	191	1.05	200	174	1.16	201
	Oct.	298	.77	230	288	.80	230
	Nov.	371	.87	323	363	.89	323
	Dec.	416	1.04	431	410	1.05	431
	Total	3,582	1.24	4,450	3,380	1.32	4,456

1/ Correlated

Table 14

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Grand Canyon, Arizona

Units — 1000

Year	Month	Historical			Present Modified			Year	Month	Historical			Present Modified		
		Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)			Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concen-tration (T./A.F.)	T.D.S. (Tons)
	Jan.	608	1.06	644	604	1.06	644		Jan.	529	0.79	418	529	0.79	418
	Feb.	539	1.09	588	536	1.09	588		Feb.	524	.87	455	524	.87	455
	March	568	1.09	619	562	1.09	619		March	718	.81	582	718	.81	582
	April	1,251	1.04	1,301	1.243	1.04	1,301		April	865	.81	700	865	.81	700
	May	2,282	1.03	2,350	2,267	1.03	2,350		May	1,011	.79	799	1,011	.79	799
	June	2,282	.89	2,038	2,267	.90	2,039		June	789	.77	609	789	.77	609
- 1965	July	724	.59	427	716	.60	428	- 1966	July	698	.75	523	698	.75	523
	Aug.	879	.86	755	876	.86	756		Aug.	694	.68	471	694	.68	471
	Sept.	767	.51	391	764	.51	392		Sept.	623	.75	468	623	.75	468
	Oct.	675	.51	344	675	.51	344		Oct.	567	.74	419	567	.74	419
	Nov.	612	.53	322	612	.53	322		Nov.	589	.71	418	589	.71	418
	Dec.	586	.69	406	586	.69	406		Dec.	670	.70	471	670	.70	471
	Total	11,773	.86	10,185	11,708	.87	10,189		Total	8,277	.76	6,333	8,277	.76	6,333
	Jan.								Jan.						
	Feb.								Feb.						
	March								March						
	April								April						
	May								May						
	June								June						
	July								July						
	Aug.								Aug.						
	Sept.								Sept.						
	Oct.								Oct.						
	Nov.								Nov.						
	Dec.								Dec.						
	Total								Total						
	Jan.								Jan.						
	Feb.								Feb.						
	March								March						
	April								April						
	May								May						
	June								June						
	July								July						
	Aug.								Aug.						
	Sept.								Sept.						
	Oct.								Oct.						
	Nov.								Nov.						
	Dec.								Dec.						
	Total								Total						
	Jan.								Jan.						
	Feb.								Feb.						
	March								March						
	April								April						
	May								May						
	June								June						
	July								July						
	Aug.								Aug.						
	Sept.								Sept.						
	Oct.								Oct.						
	Nov.								Nov.						
	Dec.								Dec.						
	Total								Total						
	Jan.								Jan.						
	Feb.								Feb.						
	March								March						
	April								April						
	May								May						
	June								June						
	July								July						
	Aug.								Aug.						
	Sept.								Sept.						
	Oct.								Oct.						
	Nov.								Nov.						
	Dec.								Dec.						
	Total								Total						
	Jan.								Jan.						
	Feb.								Feb.						
	March								March						
	April								April						
	May								May						
	June								June						
	July								July						
	Aug.								Aug.						
	Sept.								Sept.						
	Oct.								Oct.						
	Nov.								Nov.						
	Dec.								Dec.						
	Total								Total						

Table 14

Colorado River Basin
Flow and Quality of Water Data
Colorado River near Grand Canyon, Arizona
(Annual Summary)

Units — 1000

Year	Historical			Present Modified		
	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)	Flow (A.F.)	Concentration (T./A.F.)	T.D.S. (Tons)
1941	18,796	0.77	14,503	17,844	0.82	14,696
1942	14,925	.68	10,186	13,900	.75	10,359
1943	11,624	.86	10,033	10,717	.95	10,176
1944	13,330	.75	9,948	12,429	.81	10,128
1945	12,115	.83	10,097	11,218	.91	10,243
1946	9,119	.96	8,742	8,289	1.07	8,895
1947	14,347	.79	11,295	13,301	.86	11,428
1948	13,009	.75	9,799	12,149	.81	9,900
1949	14,622	.77	11,254	13,670	.83	11,323
1950	10,836	.87	9,462	10,178	.94	9,560
1951	9,934	.92	9,133	9,270	1.00	9,230
1952	18,106	.75	13,582	17,356	.79	13,665
1953	8,804	.99	8,693	8,216	1.07	8,777
1954	6,300	1.14	7,175	5,791	1.25	7,265
1955	7,287	1.03	7,494	6,778	1.12	7,564
1956	8,773	.82	7,174	8,259	.88	7,228
1957	18,910	.70	13,263	18,402	.73	13,356
1958	13,461	.73	9,854	12,984	.76	9,928
1959	7,308	1.05	7,648	6,892	1.11	7,682
1960	9,154	.86	7,833	8,738	.90	7,867
1961	7,739	1.07	8,252	7,323	1.13	8,286
1962	14,839	.73	10,817	14,440	.75	10,850
1963	1,630	1.41	2,291	1,325	1.74	2,311
1964	3,582	1.24	4,450	3,380	1.32	4,456
1965	11,773	.86	10,185	11,708	.87	10,189
1966	8,277	.76	6,333	8,277	.76	6,333
Total	288,600		239,496	272,834		241,695
Average	11,100	0.83	9,211	10,494	0.88	9,296

Table 15

Colorado River Basin

Flow and Quality of Water Data

Virgin River at Littlefield, Arizona

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	15	2.39	35	Same as historical		
	Feb.	31	1.97	61			
	March	62	.82	51			
	April	62	.84	52			
	May	131	.46	60			
	June	19	1.75	34			
1941	July	22	2.45	54			
	Aug.	20	3.02	62			
	Sept.	6	3.29	18			
	Oct.	23	3.22	74			
	Nov.	19	2.26	43			
	Dec.	17	2.28	39			
	Total	427	1.37	583			
	Jan.	20	2.25	44			
	Feb.	16	2.28	35			
	March	20	1.88	38			
	April	50	1.01	51			
	May	28	1.56	44			
	June	5	3.15	16			
1942	July	4	3.31	14			
	Aug.	9	3.29	29			
	Sept.	4	3.31	13			
	Oct.	9	3.41	31			
	Nov.	10	2.78	29			
	Dec.	11	2.72	31			
	Total	186	2.01	375			
	Jan.	18	2.32	42			
	Feb.	21	2.14	45			
	March	36	1.28	47			
	April	34	1.36	46			
	May	11	2.27	26			
	June	4	3.35	13			
1943	July	4	3.31	14			
	Aug.	13	3.35	42			
	Sept.	6	3.46	20			
	Oct.	9	3.40	30			
	Nov.	10	2.79	28			
	Dec.	13	2.51	32			
	Total	179	2.15	385			
	Jan.	13	2.47	33			
	Feb.	15	2.31	35			
	March	26	1.64	42			
	April	25	1.66	42			
	May	49	1.05	51			
	June	11	2.32	25			
1944	July	4	3.32	13			
	Aug.	4	3.31	13			
	Sept.	4	3.31	14			
	Oct.	5	3.30	16			
	Nov.	13	2.48	32			
	Dec.	12	2.65	31			
	Total	181	1.92	347			
	Jan.	11	2.68	30			
	Feb.	17	2.15	38			
	March	20	1.87	38			
	April	20	1.83	36			
	May	25	1.55	39			
	June	5	3.22	15			
1945	July	5	3.31	15			
	Aug.	26	3.06	79			
	Sept.	8	3.19	25			
	Oct.	20	3.14	62			
	Nov.	10	2.75	29			
	Dec.	14	2.47	35			
	Total	181	2.43	441			
	Jan.	13	2.48	32			
	Feb.	10	2.74	27			
	March	10	2.63	28			
	April	12	2.49	29			
	May	5	3.31	15			
	June	4	3.32	13			
1946	July	6	3.40	21			
	Aug.	13	3.17	42			
	Sept.	4	3.31	13			
	Oct.	37	2.18	81			
	Nov.	33	1.85	61			
	Dec.	22	2.12	47			
	Total	169	2.42	409			
	Jan.	15	2.34	35	Same as historical		
	Feb.	12	2.46	30			
	March	13	2.32	31			
	April	16	2.17	34			
	May	17	1.98	33			
	June	4	3.31	14			
1947	July	5	3.30	16			
	Aug.	14	2.97	41			
	Sept.	4	3.31	14			
	Oct.	8	3.34	27			
	Nov.	9	2.89	27			
	Dec.	14	2.46	34			
	Total	131	2.56	336			
	Jan.	11	2.78	29			
	Feb.	12	2.47	30			
	March	13	2.42	31			
	April	20	1.87	37			
	May	10	2.47	25			
	June	4	3.32	14			
1948	July	4	3.31	14			
	Aug.	5	3.31	18			
	Sept.	6	3.39	20			
	Oct.	6	3.34	20			
	Nov.	10	2.87	27			
	Dec.	10	2.85	29			
	Total	111	2.65	294			
	Jan.	13	2.52	32			
	Feb.	14	2.42	35			
	March	18	2.07	36			
	April	30	1.43	44			
	May	28	1.53	43			
	June	12	2.11	25			
1949	July	4	3.19	14			
	Aug.	4	3.20	13			
	Sept.	7	3.27	23			
	Oct.	9	3.07	26			
	Nov.	11	2.68	29			
	Dec.	13	2.51	34			
	Total	163	2.17	354			
	Jan.	15	2.20	33			
	Feb.	16	2.00	32			
	March	14	2.26	31			
	April	15	2.05	31			
	May	6	2.87	19			
	June	4	3.28	13			
1950	July	12	3.38	40			
	Aug.	6	3.43	19			
	Sept.	6	3.35	20			
	Oct.	5	3.40	17			
	Nov.	9	3.14	28			
	Dec.	10	2.91	30			
	Total	118	2.65	313			
	Jan.	11	2.77	30			
	Feb.	8	2.84	22			
	March	8	2.83	23			
	April	7	3.17	22			
	May	10	2.74	27			
	June	4	3.37	12			
1951	July	6	3.34	20			
	Aug.	16	3.27	55			
	Sept.	6	3.20	20			
	Oct.	7	3.24	22			
	Nov.	9	2.94	26			
	Dec.	20	2.42	49			
	Total	112	2.93	328			
	Jan.	21	2.34	49			
	Feb.	11	2.52	28			
	March	27	1.74	48			
	April	80	.76	60			
	May	71	.68	49			
	June	12	1.75	21			
1952	July	4	3.27	14			
	Aug.	5	3.43	18			
	Sept.	6	3.34	20			
	Oct.	6	3.40	20			
	Nov.	10	2.84	29			
	Dec.	14	2.53	34			
	Total	267	1.46	390			

Table 15

Colorado River Basin

Flow and Quality of Water Data

Virgin River at Littlefield, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	14	2.36	32	Same as historical		
	Feb.	9	2.70	24			
	March	7	2.98	21			
	April	6	3.27	20			
	May	5	3.27	16			
	June	4	3.34	14			
1953	July	8	3.46	28			
	Aug.	13	3.04	40			
	Sept.	4	3.38	13			
	Oct.	7	3.31	24			
	Nov.	10	3.07	29			
	Dec.	11	2.83	31			
	Total	98	3.00	292			
	Jan.	15	2.49	37			
	Feb.	12	2.36	29			
	March	17	1.98	33			
	April	23	1.64	38			
	May	10	2.35	23			
	June	5	3.36	18			
1954	July	8	3.42	26			
	Aug.	10	3.44	34			
	Sept.	9	3.56	32			
	Oct.	9	3.48	30			
	Nov.	9	3.13	29			
	Dec.	13	2.71	36			
	Total	140	2.61	365			
	Jan.	12	2.60	31			
	Feb.	12	2.51	30			
	March	11	2.53	27			
	April	6	3.14	19			
	May	5	3.18	16			
	June	4	3.39	13			
1955	July	10	3.61	37			
	Aug.	40	3.69	149			
	Sept.	5	3.26	15			
	Oct.	5	3.51	19			
	Nov.	10	3.05	31			
	Dec.	13	2.60	34			
	Total	133	3.16	421			
	Jan.	15	2.53	38			
	Feb.	11	2.59	29			
	March	8	2.87	22			
	April	6	3.13	18			
	May	4	3.23	15			
	June	4	3.34	15			
1956	July	8	3.53	27			
	Aug.	4	3.35	13			
	Sept.	4	3.35	12			
	Oct.	4	3.39	14			
	Nov.	6	3.50	21			
	Dec.	8	3.29	25			
	Total	82	3.05	249			
	Jan.	12	2.77	33			
	Feb.	14	2.32	32			
	March	10	2.64	26			
	April	6	2.99	18			
	May	15	2.04	31			
	June	9	2.85	25			
1957	July	4	3.31	13			
	Aug.	9	3.41	31			
	Sept.	4	3.27	12			
	Oct.	14	3.02	44			
	Nov.	21	2.45	51			
	Dec.	15	2.04	31			
	Total	133	2.61	347			
	Jan.	10	2.49	24			
	Feb.	19	1.83	35			
	March	41	1.43	59			
	April	64	1.02	65			
	May	69	1.05	73			
	June	7	2.29	16			
1958	July	6	3.17	19			
	Aug.	5	3.22	18			
	Sept.	22	3.13	70			
	Oct.	8	3.16	24			
	Nov.	11	2.62	28			
	Dec.	10	2.67	26			
	Total	272	1.68	457			
	Jan.	10	2.58	27	Same as historical		
	Feb.	13	2.30	31			
	March	9	2.67	24			
	April	4	3.05	13			
	May	4	3.07	13			
	June	4	3.24	12			
1959	July	4	3.32	13			
	Aug.	12	3.35	40			
	Sept.	4	3.20	13			
	Oct.	5	3.30	15			
	Nov.	13	2.90	36			
	Dec.	9	2.69	23			
	Total	91	2.87	260			
	Jan.	11	2.48	28			
	Feb.	10	2.38	24			
	March	10	2.45	24			
	April	6	2.91	17			
	May	5	3.03	14			
	June	3	3.16	10			
1960	July	4	3.18	12			
	Aug.	3	3.20	11			
	Sept.	6	3.51	20			
	Oct.	6	3.05	19			
	Nov.	12	2.80	35			
	Dec.	8	2.71	22			
	Total	84	2.79	236			
	Jan.	8	2.76	21			
	Feb.	7	2.80	20			
	March	8	2.84	23			
	April	4	3.11	14			
	May	4	3.14	12			
	June	4	3.14	12			
1961	July	8	3.22	27			
	Aug.	17	3.58	60			
	Sept.	22	3.36	73			
	Oct.	5	3.41	19			
	Nov.	8	3.07	23			
	Dec.	13	2.69	34			
	Total	108	3.14	338			
	Jan.	10	2.73	28			
	Feb.	30	1.65	50			
	March	17	2.09	35			
	April	33	1.21	40			
	May	9	2.24	19			
	June	4	3.32	12			
1962	July	4	3.29	13			
	Aug.	3	3.46	11			
	Sept.	7	3.28	24			
	Oct.	7	3.32	21			
	Nov.	6	3.18	20			
	Dec.	7	2.75	20			
	Total	137	2.14	293			
	Jan.	9	2.54	23			
	Feb.	9	2.56	23			
	March	6	3.14	19			
	April	4	3.43	15			
	May	4	3.41	13			
	June	3	3.44	11			
1963	July	3	3.48	12			
	Aug.	11	3.33	36			
	Sept.	14	3.54	48			
	Oct.	5	3.32	18			
	Nov.	10	3.00	28			
	Dec.	7	2.96	20			
	Total	85	3.14	266			
	Jan.	7	2.96	20			
	Feb.	7	2.88	21			
	March	7	2.99	20			
	April	13	2.22	28			
	May	11	2.22	24			
	June	3	3.50	10			
1964	July	4	3.63	14			
	Aug.	14	3.81	53			
	Sept.	3	3.63	11			
	Oct.	3	3.58	12			
	Nov.	6	3.32	22			
	Dec.	9	2.98	26			
	Total	87	3.01	261			

Table 15

Colorado River Basin

Flow and Quality of Water Data

Virgin River at Littlefield, Arizona

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	9	2.78	25	Same as historical		
	Feb.	8	2.75	22			
	March	8	2.62	21			
	April	30	2.00	60			
	May	23	1.52	35			
	June	9	2.11	19			
- 1965	July	3	3.67	11			
	Aug.	5	3.40	17			
	Sept.	6	3.00	18			
	Oct.	6	3.00	18			
	Nov.	21	1.90	40			
	Dec.	26	1.58	41			
	Total	154	2.12	327			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	13	2.31	30	Same as historical		
	Feb.	11	2.45	27			
	March	14	1.50	29			
	April	17	1.70	29			
	May	6	3.00	18			
	June	3	4.00	12			
- 1966	July	3	4.00	12			
	Aug.	3	3.67	11			
	Sept.	4	3.50	14			
	Oct.	6	3.33	20			
	Nov.	9	2.78	25			
	Dec.	73	1.99	145			
	Total	162	2.30	372			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
- 1966	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 15

Colorado River Basin
Flow and Quality of Water Data
Virgin River at Littlefield, Arizona
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	427	1.37	583	Same as historical		
1942	186	2.01	375			
1943	179	2.15	385			
1944	181	1.92	347			
1945	181	2.43	441			
1946	169	2.42	409			
1947	131	2.56	336			
1948	111	2.65	294			
1949	163	2.17	354			
1950	118	2.65	313			
1951	112	2.93	328			
1952	267	1.46	390			
1953	98	3.00	292			
1954	140	2.61	365			
1955	133	3.16	421			
1956	82	3.05	249			
1957	133	2.61	347			
1958	272	1.68	457			
1959	91	2.87	260			
1960	84	2.79	236			
1961	108	3.14	338			
1962	137	2.14	293			
1963	85	3.14	266			
1964	87	3.01	261			
1965	154	2.12	327			
1966	162	2.30	372			
Total	3,991		9,039			
Average	154	2.26	348			

Table 16

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Hoover Dam, Arizona-Nevada

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	589	1.08	636	511	1.27	651
	Feb.	500	1.11	555	422	1.35	571
	March	552	1.10	607	473	1.31	623
	April	518	1.08	560	439	1.31	576
	May	1,435	1.08	1,550	1,356	1.15	1,566
	June	1,810	1.07	1,935	1,731	1.13	1,951
-1941	July	951	1.06	1,007	871	1.17	1,023
	Aug.	1,429	.97	1,386	1,349	1.04	1,403
	Sept.	1,576	.94	1,481	1,496	1.00	1,498
	Oct.	1,641	.94	1,543	1,561	1.00	1,559
	Nov.	1,817	.93	1,690	1,737	.98	1,706
	Dec.	2,071	.94	1,947	1,991	.99	1,963
	Total	14,889	1.00	14,897	13,937	1.08	15,090
	Jan.	2,011	1.00	2,011	1,926	1.05	2,026
	Feb.	1,550	.99	1,535	1,465	1.06	1,550
	March	1,425	1.00	1,425	1,339	1.08	1,440
	April	1,301	1.00	1,301	1,215	1.08	1,315
	May	1,343	1.00	1,343	1,257	1.08	1,357
	June	1,561	1.01	1,577	1,475	1.08	1,591
-1942	July	1,285	.99	1,272	1,199	1.07	1,286
	Aug.	846	.99	838	761	1.12	853
	Sept.	1,025	.98	1,005	940	1.08	1,020
	Oct.	1,163	.95	1,105	1,078	1.04	1,119
	Nov.	1,095	.90	986	1,010	.99	1,000
	Dec.	1,157	.85	983	1,072	.93	997
	Total	15,762	.98	15,381	14,737	1.06	15,554
	Jan.	1,109	.87	965	1,035	.94	976
	Feb.	823	.89	732	749	.99	743
	March	971	.94	913	896	1.03	924
	April	915	.95	869	839	1.05	881
	May	1,029	.94	967	953	1.03	979
	June	1,040	.93	967	964	1.02	979
-1943	July	1,109	.91	1,009	1,033	.99	1,021
	Aug.	1,042	.92	959	966	1.01	972
	Sept.	1,042	.91	948	966	.99	961
	Oct.	1,179	.90	1,061	1,103	.97	1,073
	Nov.	1,179	.86	1,014	1,103	.93	1,026
	Dec.	1,277	.86	1,098	1,201	.92	1,110
	Total	12,715	.90	11,502	11,808	.99	11,645
	Jan.	1,303	.88	1,147	1,228	.95	1,162
	Feb.	1,269	.97	1,231	1,194	1.04	1,246
	March	1,307	.96	1,254	1,231	1.03	1,269
	April	1,170	.97	1,135	1,095	1.05	1,150
	May	1,216	.98	1,192	1,141	1.06	1,207
	June	1,097	.95	1,042	1,022	1.03	1,057
-1944	July	1,111	.93	1,033	1,036	1.01	1,048
	Aug.	1,211	.92	1,113	1,136	.99	1,129
	Sept.	1,132	.89	1,007	1,057	.97	1,023
	Oct.	1,226	1/ .94	1,152	1,151	1.01	1,167
	Nov.	1,186	1/ .99	1,174	1,111	1.07	1,188
	Dec.	1,199	.94	1,127	1,124	1.02	1,141
	Total	14,427	.94	13,607	13,526	1.02	13,787
	Jan.	1,239	.93	1,152	1,166	1.00	1,164
	Feb.	1,100	1/ .96	1,056	1,026	1.04	1,068
	March	1,250	2/ .96	1,200	1,175	1.03	1,212
	April	1,042	1/ .95	990	967	1.04	1,002
	May	1,068	1/ .90	961	993	.98	973
	June	1,014	2/ .91	923	939	1.00	935
-1945	July	861	.92	792	786	1.02	804
	Aug.	885	1/ .93	823	810	1.03	836
	Sept.	869	1/ .90	782	794	1.00	795
	Oct.	1,080	1/ .88	950	1,005	.96	962
	Nov.	1,042	1/ .90	938	967	.98	950
	Dec.	1,062	1/ .89	945	987	.97	957
	Total	12,512	.92	11,512	11,615	1.00	11,658
	Jan.	1,116	.87	971	1,048	.94	983
	Feb.	1,047	1/ .95	994	979	1.03	1,006
	March	1,004	.88	884	935	.96	896
	April	*872	.89	*776	803	.98	788
	May	903	1/ .96	867	833	1.05	879
	June	817	1/ .92	752	747	1.02	765
-1946	July	838	.90	754	768	1.00	767
	Aug.	751	1/ .91	683	681	1.02	697
	Sept.	759	2/ .91	691	690	1.02	705
	Oct.	857	1/ .92	788	788	1.02	801
	Nov.	762	2/ .91	693	693	1.02	706
	Dec.	859	1/ .90	773	790	1.00	786
	Total	*10,585	.91	*9,626	9,755	1.00	9,779
	Jan.	984	0.90	886	898	1.00	897
	Feb.	886	.91	806	[illegible]	1.02	817
	March	956	.92	[illegible]	[illegible]	1.02	890
	April	859	1/ .99	[illegible]	[illegible]	1.11	861
	May	951	1/ 1.03	[illegible]	863	1.15	990
	June	919	1/ .95	[illegible]	[illegible]	1.06	884
-1947	July	925	.96	888	837	1.07	899
	Aug.	865	1/ .92	795	777	1.04	808
	Sept.	843	2/ .92	776	756	1.04	788
	Oct.	828	1/ .92	762	741	1.04	772
	Nov.	880	2/ .92	810	793	1.04	821
	Dec.	1,063	1/ .92	978	976	1.01	989
	Total	10,959	.94	10,283	9,913	1.05	10,416
	Jan.	1,169	2/ .93	1,087	1,098	1.00	1,095
	Feb.	1,138	1/ .93	1,058	1,067	1.00	1,066
	March	1,150	1/ .93	1,070	1,078	1.00	1,078
	April	1,202	1/ .97	1,166	1,130	1.04	1,174
	May	1,142	1/ .93	1,062	1,070	1.00	1,071
	June	1,076	1/ .88	947	1,005	.95	956
-1948	July	1,156	1/ .86	994	1,085	.93	1,003
	Aug.	968	2/ .86	833	896	.94	842
	Sept.	981	1/ .85	834	909	.93	843
	Oct.	917	1/ .80	734	845	.88	742
	Nov.	1,028	.88	905	956	.95	913
	Dec.	1,124	1/ .91	1,023	1,052	.98	1,031
	Total	13,051	.90	11,713	12,191	.97	11,814
	Jan.	1,212	.83	1,006	1,133	.89	1,011
	Feb.	1,214	1/ .84	1,020	1,135	.90	1,025
	March	1,291	1/ .85	1,097	1,211	.91	1,102
	April	1,178	1/ .86	1,013	1,098	.93	1,018
	May	1,026	1/ .83	852	946	.91	857
	June	986	.87	858	906	.95	864
-1949	July	1,020	.84	857	941	.92	863
	Aug.	1,062	.80	850	983	.87	857
	Sept.	1,141	.78	890	1,062	.84	897
	Oct.	1,176	.75	882	1,097	.81	888
	Nov.	1,022	1/ .83	848	943	.91	854
	Dec.	1,238	.87	1,077	1,159	.94	1,083
	Total	13,566	.83	11,250	12,614	.90	11,319
	Jan.	1,277	.83	1,060	1,223	.87	1,068
	Feb.	1,132	.81	917	1,078	.86	925
	March	1,246	.85	1,059	1,191	.90	1,067
	April	1,089	.85	926	1,034	.90	934
	May	1,120	1/ .84	941	1,065	.89	949
	June	960	1/ .83	797	905	.89	805
-1950	July	982	.79	776	927	.84	784
	Aug.	872	1/ .82	715	817	.89	724
	Sept.	824	1/ .79	651	769	.86	660
	Oct.	848	.89	755	793	.96	763
	Nov.	815	.88	717	760	.95	725
	Dec.	851	.86	732	796	.93	740
	Total	12,016	.84	10,046	11,358	.89	10,144
	Jan.	928	.87	807	874	.93	815
	Feb.	756	.87	658	702	.95	666
	March	860	.91	783	805	.98	791
	April	796	.93	740	741	1.01	748
	May	898	.92	826	843	.99	834
	June	691	.91	629	636	1.00	637
-1951	July	783	.92	720	727	1.00	728
	Aug.	907	.93	844	851	1.00	853
	Sept.	848	.92	780	792	.99	788
	Oct.	756	.93	703	700	1.02	711
	Nov.	818	.93	761	762	1.01	769
	Dec.	829	.91	754	773	.99	762
	Total	9,870	.91	9,005	9,206	.99	9,102
	Jan.	1,070	.90	963	932	.96	894
	Feb.	1,212	.93	1,127	1,040	.98	1,017
	March	1,371	.94	1,289	1,251	.99	1,235
	April	1,385	.94	1,302	1,277	.99	1,260
	May	1,532	.94	1,440	1,347	.99	1,330
	June	1,432	.91	1,303	1,408	.96	1,347
-1952	July	1,304	.83	1,082	1,131	.88	992
	Aug.	1,307	.79	1,033	1,183	.84	990
	Sept.	1,359	.73	992	1,258	.77	963
	Oct.	1,291	.69	891	1,102	.72	799
	Nov.	1,215	.66	802	1,236	.69	858
	Dec.	1,338	.88	1,177	1,238	.93	1,148
	Total	15,816	.85	13,401	14,403	.89	12,833

* Revised.
1/ Estimated or partially estimated.
2/ Average of adjacent values.

Table 16

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Hoover Dam, Arizona-Nevada

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	1,227	0.93	1,141	1,179	0.97	1,147
	Feb.	1,043	.91	949	995	.96	955
	March	1,046	.93	973	997	.98	980
	April	971	.94	913	922	1.00	920
	May	998	.91	908	949	.96	915
	June	819	.89	729	769	.91	736
	July	897	.87	780	847	.93	787
	Aug.	968	.87	842	919	.92	850
	Sept.	968	.86	832	919	.91	840
	Oct.	802	.86	690	753	.93	697
	Nov.	749	.86	644	700	.93	651
	Dec.	814	.85	692	765	.91	699
	Total	11,302	.89	10,093	10,714	.95	10,177
1954	Jan.	836	.88	736	795	.93	743
	Feb.	721	.94	678	680	1.01	685
	March	911	.95	865	869	1.00	872
	April	975	.94	916	933	.99	923
	May	1,101	.93	1,024	1,059	.97	1,031
	June	929	.94	873	886	.99	880
	July	1,027	.94	965	984	.99	972
	Aug.	888	.97	861	845	1.03	869
	Sept.	933	.97	905	890	1.03	914
	Oct.	776	.94	729	733	1.01	737
	Nov.	676	.95	642	633	1.03	650
	Dec.	741	.97	719	698	1.04	727
	Total	10,514	.94	9,913	10,005	1.00	10,003
1955	Jan.	725	.99	718	683	1.06	724
	Feb.	705	1.04	733	663	1.11	739
	March	906	1.08	978	863	1.14	984
	April	882	1.11	979	839	1.17	985
	May	928	1.12	1,039	885	1.18	1,045
	June	680	1.12	762	637	1.21	768
	July	847	1.11	940	804	1.18	946
	Aug.	789	1.12	884	747	1.19	891
	Sept.	622	1.11	690	580	1.20	696
	Oct.	526	1.12	589	484	1.23	594
	Nov.	487	1.12	545	445	1.24	550
	Dec.	492	1.09	536	450	1.20	541
	Total	8,589	1.09	9,393	8,080	1.17	9,463
1956	Jan.	583	1.09	635	617	1.16	715
	Feb.	499	1.10	549	567	1.18	670
	March	769	1.12	861	783	1.18	926
	April	840	1.14	958	842	1.20	1,011
	May	748	1.15	860	827	1.19	981
	June	784	1.17	917	702	1.26	884
	July	782	1.19	931	849	1.22	1,032
	Aug.	696	1.17	814	714	1.22	870
	Sept.	610	1.15	702	606	1.23	745
	Oct.	490	1.16	568	574	1.17	671
	Nov.	554	1.12	620	428	1.34	575
	Dec.	457	1.10	503	452	1.20	543
	Total	7,812	1.14	8,918	7,961	1.21	9,623
1957	Jan.	534	1.07	571	493	1.17	579
	Feb.	470	1.08	508	429	1.20	516
	March	739	1.11	820	697	1.19	828
	April	890	1.09	970	848	1.15	978
	May	769	1.07	823	727	1.14	831
	June	828	1.06	878	786	1.13	886
	July	786	1.05	825	743	1.12	833
	Aug.	786	1.03	810	743	1.10	818
	Sept.	785	1.02	801	742	1.09	809
	Oct.	697	1.02	711	654	1.10	718
	Nov.	958	.99	948	915	1.04	955
	Dec.	1,081	.94	1,016	1,038	.99	1,023
	Total	9,323	1.04	9,681	8,815	1.11	9,774
1958	Jan.	1,245	.90	1,120	1,206	.93	1,126
	Feb.	846	.94	795	807	.99	801
	March	1,435	.90	1,292	1,395	.93	1,298
	April	1,473	.88	1,296	1,433	.91	1,302
	May	1,115	.84	937	1,075	.88	943
	June	819	.85	696	779	.90	702
	July	894	.85	760	854	.90	766
	Aug.	911	.83	756	871	.87	763
	Sept.	792	.83	657	752	.88	664
	Oct.	728	.82	597	688	.88	603
	Nov.	746	.82	612	706	.88	618
	Dec.	873	.83	725	834	.88	731
	Total	11,877	.86	10,243	11,400	.90	10,317

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	795	0.85	676	761	0.89	678
	Feb.	648	.83	537	614	.88	539
	March	827	.88	728	792	.92	731
	April	916	.91	834	881	.95	837
	May	949	.86	816	914	.89	819
	June	760	.85	646	725	.89	648
	July	848	.84	713	813	.88	715
	Aug.	894	.83	742	859	.87	746
	Sept.	773	.81	626	738	.85	630
	Oct.	693	.82	568	659	.87	571
	Nov.	607	.81	492	573	.86	495
	Dec.	572	.81	463	537	.87	466
	Total	9,282	.84	7,841	8,866	.89	7,875
1960	Jan.	629	.86	541	595	.91	544
	Feb.	512	.89	456	478	.96	459
	March	710	.89	632	675	.94	635
	April	909	.93	845	874	.97	848
	May	856	.93	796	821	.97	799
	June	1,015	.92	934	980	.95	936
	July	984	.89	876	949	.92	878
	Aug.	959	.93	892	925	.97	896
	Sept.	806	.93	749	772	.97	753
	Oct.	556	.92	512	521	.99	515
	Nov.	489	.92	450	454	.99	452
	Dec.	572	.92	526	537	.98	528
	Total	8,997	.91	8,209	8,581	.96	8,243
1961	Jan.	591	.93	549	557	.99	552
	Feb.	577	.94	543	543	1.01	546
	March	936	.95	889	901	.99	891
	April	904	.97	877	870	1.01	879
	May	943	.95	896	909	.99	899
	June	842	.94	791	807	.98	794
	July	822	.94	772	787	.98	774
	Aug.	739	.96	709	704	1.01	712
	Sept.	690	.96	663	655	1.02	667
	Oct.	539	.93	502	504	1.00	505
	Nov.	517	.94	486	482	1.01	489
	Dec.	486	.95	462	451	1.03	465
	Total	8,586	.95	8,139	8,170	1.00	8,173
1962	Jan.	482	.93	448	449	1.00	451
	Feb.	497	1/ .94	467	464	1.01	470
	March	798	1/ .94	750	764	.99	753
	April	902	1/ .95	857	868	.99	860
	May	887	1.00	887	853	1.04	889
	June	799	1/ .94	751	766	.98	753
	July	824	1/ .91	750	791	.95	753
	Aug.	857	1/ .87	746	824	.91	749
	Sept.	716	1.00	716	683	1.05	719
	Oct.	634	1/ .86	545	601	.91	547
	Nov.	613	1/ .90	552	580	.96	555
	Dec.	606	1/ .93	564	573	.99	567
	Total	8,615	1/ .93	8,033	8,216	.98	8,066
1963	Jan.	482	.99	478	457	1.05	479
	Feb.	575	1/ .97	558	550	1.02	559
	March	871	1/ .95	828	845	.98	829
	April	865	1/ .94	813	839	.97	814
	May	911	.93	847	885	.96	848
	June	764	1/ .92	702	738	.95	703
	July	908	1/ .91	826	882	.94	828
	Aug.	857	.90	771	832	.93	774
	Sept.	724	.89	645	699	.93	648
	Oct.	527	.90	475	502	.95	477
	Nov.	464	.89	413	439	.95	415
	Dec.	585	.90	526	560	.94	528
	Total	8,533	1/ .92	7,882	8,228	.96	7,902
1964	Jan.	633	.93	589	617	.95	589
	Feb.	583	.94	548	567	.97	548
	March	800	.95	760	783	.97	760
	April	859	.98	842	842	1.00	842
	May	844	.98	827	827	1.00	828
	June	719	.99	712	702	1.02	713
	July	866	.98	849	849	1.00	850
	Aug.	731	.99	724	714	1.02	726
	Sept.	623	.99	616	606	1.02	617
	Oct.	591	1.01	596	574	1.04	596
	Nov.	445	1.02	454	428	1.06	454
	Dec.	469	1.06	497	452	1.10	497
	Total	8,163	.98	8,014	7,961	1.01	8,020

1/ Estimated or partially estimated.

Table 16

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Hoover Dam, Arizona-Nevada

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1965	Jan.	489	1.08	528	484	1.09	528
	Feb.	498	1.09	543	493	1.10	543
	March	786	1.15	903	781	1.16	903
	April	698	1.14	796	693	1.15	796
	May	872	1.14	994	866	1.15	994
	June	786	1.08	848	780	1.09	849
	July	815	1.08	880	809	1.09	881
	Aug.	817	1.11	907	811	1.12	908
	Sept.	655	1.12	734	649	1.13	735
	Oct.	535	1.05	562	530	1.06	562
	Nov.	418	1.03	430	413	1.04	430
	Dec.	423	1.06	449	418	1.07	449
	Total	7,792	1.10	8,574	7,727	1.11	8,578
	Jan.						
	Feb.						
	March						
	April						
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	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
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	Nov.						
	Dec.						
	Total						
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	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1966	Jan.	252	1.03	260	252	1.03	260
	Feb.	436	1.02	445	436	1.02	445
	March	785	1.05	824	785	1.05	824
	April	846	1.27	888	846	1.27	888
	May	887	1.03	914	887	1.03	914
	June	783	1.06	831	783	1.06	831
	July	889	1.01	897	889	1.01	897
	Aug.	839	.98	822	839	.98	822
	Sept.	672	1.00	672	672	1.00	672
	Oct.	467	.96	448	467	.96	448
	Nov.	473	.93	440	473	.93	440
	Dec.	448	.93	416	448	.93	416
	Total	7,777	1.01	7,857	7,777	1.01	7,857
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	March						
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	Total						
	Jan.						
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	March						
	April						
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	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 16

Colorado River Basin
Flow and Quality of Water Data
Colorado River below Hoover Dam, Arizona, Nevada
(Annual Summary)

Units —1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	14,889	1.00	14,897	13,937	1.08	15,090
1942	15,762	.98	15,381	14,737	1.06	15,554
1943	12,715	.90	11,502	11,808	.99	11,645
1944	14,427	.94	13,607	13,526	1.02	13,787
1945	12,512	.92	11,512	11,615	1.00	11,658
1946	10,585	.91	9,626	9,755	1.00	9,779
1947	10,959	.94	10,283	9,913	1.05	10,416
1948	13,051	.90	11,713	12,191	.97	11,814
1949	13,566	.83	11,250	12,614	.90	11,319
1950	12,016	.84	10,046	11,358	.89	10,144
1951	9,870	.91	9,005	9,206	.99	9,102
1952	15,816	.85	13,401	14,403	.89	12,833
1953	11,302	.89	10,093	10,714	.95	10,177
1954	10,514	.94	9,913	10,005	1.00	10,003
1955	8,589	1.09	9,393	8,080	1.17	9,463
1956	7,812	1.14	8,918	7,961	1.21	9,623
1957	9,323	1.04	9,681	8,815	1.11	9,774
1958	11,877	.86	10,243	11,400	.90	10,317
1959	9,282	.84	7,841	8,866	.89	7,875
1960	8,997	.91	8,209	8,581	.96	8,243
1961	8,586	.95	8,139	8,170	1.00	8,173
1962	8,615	.93	8,033	8,216	.98	8,066
1963	8,533	.92	7,882	8,228	.96	7,902
1964	8,163	.98	8,014	7,961	1.01	8,020
1965	7,792	1.10	8,574	7,727	1.11	8,578
1966	7,777	1.01	7,857	7,777	1.01	7,857
Total	283,330		265,013	267,564		267,212
Average	10,897	0.94	10,193	10,291	1.00	10,277

Measured flow record entire period.

Table 17

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Parker Dam, Arizona-California

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	627	1.09	683	484	1.25	604
	Feb.	561	1.12	628	400	1.37	549
	March	750	1.11	833	591	1.28	754
	April	608	1.09	663	416	1.40	584
	May	1,359	1.09	1,481	1,186	1.18	1,402
	June	1,628	1.08	1,758	1,451	1.15	1,678
	July	998	1.07	1,068	821	1.21	988
	Aug.	1,332	1.01	1,345	1,152	1.10	1,266
	Sept.	1,528	.95	1,452	1,352	1.02	1,373
	Oct.	1,585	.95	1,506	1,410	1.01	1,426
	Nov.	1,731	.92	1,593	1,554	.97	1,513
	Dec.	2,042	1.00	2,042	1,865	1.05	1,962
	Total	14,749	1.02	15,052	12,682	1.11	14,099
1942	Jan.	1,957	.97	1,898	1,807	1.01	1,823
	Feb.	1,482	.97	1,438	1,314	1.04	1,363
	March	1,494	.96	1,434	1,328	1.02	1,359
	April	1,136	.98	1,113	937	1.11	1,038
	May	1,588	.98	1,556	1,409	1.15	1,482
	June	1,536	.98	1,505	1,353	1.16	1,430
	July	1,226	.95	1,165	1,043	1.05	1,090
	Aug.	880	1.04	915	694	1.21	841
	Sept.	797	.97	773	615	1.14	700
	Oct.	845	.96	811	665	1.11	737
	Nov.	1,041	.96	999	859	1.08	925
	Dec.	1,213	.87	1,055	1,031	.95	981
	Total	15,195	.96	14,662	13,055	1.05	13,769
1943	Jan.	1,015	.91	924	875	.98	853
	Feb.	746	.86	642	588	.97	571
	March	886	.95	842	730	1.05	771
	April	877	.93	816	688	1.08	745
	May	957	.95	909	788	1.06	839
	June	976	.96	937	803	1.08	866
	July	1,086	.89	967	913	.98	896
	Aug.	990	.89	881	815	.99	811
	Sept.	1,006	.88	885	835	.98	815
	Oct.	1,160	.89	1,032	990	.97	961
	Nov.	1,149	.85	977	977	.93	906
	Dec.	1,231	.85	1,046	1,059	.92	975
	Total	12,079	.90	10,858	10,061	.99	10,009
1944	Jan.	1,241	.88	1,092	1,103	.93	1,024
	Feb.	1,223	.90	1,101	1,067	.97	1,033
	March	1,297	.93	1,206	1,143	1.00	1,138
	April	1,164	.95	1,106	977	1.06	1,038
	May	1,116	.95	1,060	950	1.05	994
	June	983	.96	944	813	1.08	877
	July	1,035	.93	963	865	1.04	896
	Aug.	1,148	.93	1,068	975	1.03	1,002
	Sept.	1,114	.87	969	944	.96	902
	Oct.	1,178	.86	1,013	1,009	.94	945
	Nov.	1,156	.86	994	985	.94	926
	Dec.	1,187	.91	1,080	1,016	1.00	1,012
	Total	13,842	.91	12,596	11,847	.99	11,787
1945	Jan.	1,186	.92	1,091	1,050	.97	1,023
	Feb.	1,061	.89	944	907	.97	876
	March	1,232	.91	1,121	1,080	.98	1,053
	April	985	.92	906	799	1.05	838
	May	970	.92	892	804	1.02	824
	June	919	.97	891	749	1.10	822
	July	913	.90	822	743	1.01	753
	Aug.	770	.88	678	597	1.02	610
	Sept.	824	.89	733	655	1.02	665
	Oct.	1,038	.83	862	870	.91	793
	Nov.	1,036	.87	901	866	.96	832
	Dec.	1,099	.88	967	929	.97	898
	Total	12,033	.90	10,808	10,049	.99	9,987
1946	Jan.	1,041	.88	916	911	.93	850
	Feb.	1,028	.94	966	880	1.02	900
	March	944	.87	821	798	.95	755
	April	830	.90	747	651	1.05	681
	May	873	.92	803	715	1.03	738
	June	754	.90	679	592	1.04	613
	July	801	.89	713	639	1.01	647
	Aug.	722	.87	628	557	1.01	563
	Sept.	730	.89	650	569	1.03	585
	Oct.	759	.89	676	599	1.02	610
	Nov.	789	.89	702	627	1.01	636
	Dec	870	.89	774	708	1.00	707
	Total	10,141	.89	9,075	8,246	1.00	8,285
1947	Jan.	953	0.89	848	806	0.97	779
	Feb.	899	.90	809	734	1.01	740
	March	940	.92	865	777	1.02	796
	April	797	.95	757	602	1.14	688
	May	905	.96	869	729	1.10	801
	June	860	.96	826	680	1.11	757
	July	844	.95	802	664	1.10	733
	Aug.	892	.94	838	709	1.09	770
	Sept.	819	.95	778	640	1.11	710
	Oct.	837	.89	745	659	1.03	676
	Nov.	880	.85	748	700	.97	678
	Dec.	1,037	.81	840	857	.90	771
	Total	10,663	.91	9,725	8,557	1.04	8,899
1948	Jan.	1,160	.93	1,079	1,038	.98	1,018
	Feb.	1,160	.89	1,032	1,020	.95	971
	March	1,107	.89	985	969	.95	924
	April	1,083	.90	975	912	1.00	914
	May	1,115	.89	992	964	.97	932
	June	989	.91	900	834	1.01	839
	July	1,108	.88	975	953	.96	915
	Aug.	986	.87	858	828	.96	799
	Sept.	941	.86	809	786	.95	750
	Oct.	918	.84	771	764	.93	711
	Nov.	978	.79	773	822	.87	713
	Dec.	1,106	.90	995	950	.98	935
	Total	12,651	.88	11,144	10,840	.96	10,421
1949	Jan.	1,229	.87	1,069	1,098	.92	1,009
	Feb.	1,192	.83	989	1,043	.89	929
	March	1,236	.82	1,014	1,089	1.02	954
	April	1,116	.86	960	936	.96	900
	May	983	.86	845	822	.96	786
	June	923	.87	803	758	.98	743
	July	952	.87	828	787	.97	768
	Aug.	1,013	.82	831	845	.91	772
	Sept.	1,099	.81	890	936	.89	831
	Oct.	1,148	.78	895	986	.85	835
	Nov.	1,011	.75	758	847	.82	698
	Dec.	1,158	.72	834	994	.78	775
	Total	13,060	.82	10,716	11,141	.90	10,000
1950	Jan.	1,080	.84	907	974	.87	848
	Feb.	1,036	.83	860	912	.88	801
	March	1,209	.82	991	1,087	.86	932
	April	998	.86	858	842	.95	799
	May	1,066	.86	917	930	.92	859
	June	900	.85	765	760	.93	706
	July	897	.83	745	757	.91	686
	Aug.	833	.82	683	690	.91	625
	Sept.	704	.82	577	565	.92	519
	Oct.	651	.84	547	513	.95	487
	Nov.	542	.86	466	402	1.01	407
	Dec.	557	.87	485	417	1.02	425
	Total	10,473	.84	8,801	8,849	.92	8,094
1951	Jan.	550	.87	479	448	.94	420
	Feb.	501	.88	441	380	1.00	382
	March	730	.88	642	611	.95	583
	April	765	.87	666	613	.99	607
	May	675	.88	594	543	.99	536
	June	862	.88	759	726	.97	701
	July	945	.89	841	809	.97	783
	Aug.	945	.87	822	806	.95	765
	Sept.	723	.86	622	588	.96	565
	Oct.	709	.88	624	575	.98	566
	Nov.	560	.88	493	424	1.14	435
	Dec.	707	.89	629	571	1.00	571
	Total	8,672	.88	7,612	7,094	.97	6,914
1952	Jan.	1,104	.89	983	862	.94	806
	Feb.	1,134	.87	987	805	.92	744
	March	1,424	.87	1,239	1,200	.91	1,093
	April	1,300	.90	1,170	1,086	.98	1,064
	May	1,443	.92	1,328	1,291	.97	1,254
	June	1,419	.92	1,305	1,235	.98	1,203
	July	1,263	.88	1,111	1,036	.95	981
	Aug.	1,296	.83	1,076	1,093	.89	971
	Sept.	1,321	.79	1,044	1,139	.83	950
	Oct.	1,234	.74	913	1,100	.78	860
	Nov.	1,172	.69	809	996	.73	731
	Dec.	1,303	.67	873	1,114	.70	781
	Total	15,413	.83	12,838	12,957	.88	11,438

Table 17

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Parker Dam, Arizona-California

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	1,198	0.66	791	1,101	0.67	734
	Feb.	1,020	.81	826	905	.85	769
	March	947	.88	833	834	.93	776
	April	808	.91	735	662	1.02	678
	May	953	.90	858	827	.97	802
	June	956	.90	860	826	.97	802
	July	1,093	.87	951	963	.93	893
	Aug.	1,056	.84	887	924	.90	831
	Sept.	823	.83	683	695	.90	627
	Oct.	634	.84	533	506	.94	476
	Nov.	527	.85	448	397	.98	391
	Dec.	634	.85	539	504	.96	482
	Total	10,649	.84	8,944	9,144	.90	8,261
1954	Jan.	797	.84	669	716	.86	618
	Feb.	661	.83	549	562	.89	498
	March	782	.84	657	685	.88	606
	April	864	.84	726	734	.92	675
	May	1,015	.89	903	906	.94	853
	June	883	.92	812	769	.99	761
	July	1,000	.91	910	886	.97	858
	Aug.	982	.91	894	865	.97	843
	Sept.	754	.91	686	641	.99	635
	Oct.	636	.92	585	524	1.02	533
	Nov.	638	.92	587	524	1.02	535
	Dec.	659	.92	606	545	1.02	554
	Total	9,671	.89	8,584	8,357	.95	7,969
1955	Jan.	734	.93	683	660	.95	627
	Feb.	598	.94	562	506	1.00	506
	March	733	.96	704	643	1.01	648
	April	758	.97	735	635	1.07	680
	May	792	.99	784	688	1.06	729
	June	866	1.03	892	759	1.10	836
	July	963	1.07	1,030	855	1.14	974
	Aug.	849	1.06	900	738	1.14	845
	Sept.	694	1.04	722	587	1.13	668
	Oct.	499	1.06	529	393	1.21	473
	Nov.	369	1.09	402	261	1.33	346
	Dec.	286	1.09	312	178	1.44	256
	Total	8,141	1.01	8,255	6,903	1.10	7,588
1956	Jan.	317	1.10	349	374	1.10	412
	Feb.	365	1.10	402	473	1.12	531
	March	628	1.10	691	635	1.14	723
	April	684	1.09	746	615	1.20	737
	May	671	1.07	718	580	1.17	678
	June	787	1.09	858	720	1.17	844
	July	865	1.10	952	842	1.15	966
	Aug.	823	1.09	897	770	1.15	888
	Sept.	634	1.12	710	568	1.22	690
	Oct.	486	1.08	525	375	1.24	463
	Nov.	321	1.11	356	248	1.28	319
	Dec.	288	1.14	328	227	1.34	305
	Total	6,869	1.10	7,532	6,427	1.18	7,556
1957	Jan.	243	1.15	279	184	1.30	239
	Feb.	349	1.12	391	272	1.29	351
	March	589	1.09	642	514	1.17	602
	April	731	1.06	775	623	1.18	735
	May	645	1.06	684	557	1.16	646
	June	783	1.05	822	690	1.13	783
	July	890	1.03	917	797	1.10	878
	Aug.	817	1.01	825	721	1.09	787
	Sept.	661	.99	654	569	1.08	616
	Oct.	503	1.00	503	412	1.10	464
	Nov.	781	1.00	781	688	1.08	742
	Dec.	1,005	1.01	1,015	912	1.07	976
	Total	7,997	1.04	8,288	6,939	1.13	7,819
1958	Jan.	1,285	.97	1,246	1,223	.99	1,210
	Feb.	565	.93	525	485	1.01	489
	March	1,345	.89	1,197	1,267	.92	1,161
	April	1,333	.87	1,160	1,222	.92	1,124
	May	1,013	.85	861	922	.89	825
	June	854	.84	717	759	.89	680
	July	930	.84	781	836	.89	744
	Aug.	867	.82	711	770	.88	675
	Sept.	714	.81	578	621	.87	542
	Oct.	610	.82	500	518	.89	463
	Nov.	623	.82	511	528	.90	474
	Dec.	753	.83	625	658	.89	588
	Total	10,892	.86	9,412	9,809	.91	8,975

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	577	0.82	555	634	0.83	527
	Feb.	593	.82	[illegible]	532	.86	459
	March	690	.82	[illegible]	631	.85	539
	April	832	.83	[illegible]	740	.89	664
	May	706	.86	607	634	.92	581
	June	797	.87	693	721	.92	666
	July	962	.84	808	886	.88	781
	Aug.	873	.79	690	795	.84	664
	Sept.	682	.80	546	608	.86	520
	Oct.	558	.83	463	485	.90	436
	Nov.	405	.84	340	330	.95	313
	Dec.	411	.83	341	336	.93	314
	Total	8,186	.83	6,786	7,332	.88	6,464
1960	Jan.	428	.82	351	401	.84	337
	Feb.	474	.81	384	429	.84	369
	March	760	.81	616	717	.84	601
	April	810	.85	689	734	.92	674
	May	740	.86	636	684	.91	622
	June	879	.88	774	819	.93	759
	July	986	.87	858	926	.91	843
	Aug.	868	.88	764	805	.93	750
	Sept.	640	.87	557	581	.93	543
	Oct.	490	.86	421	432	.94	407
	Nov.	397	.89	353	337	1.00	339
	Dec.	322	.91	293	262	1.06	279
	Total	7,794	.86	6,696	7,127	.91	6,523
1961	Jan.	379	.91	345	370	.93	345
	Feb.	453	.90	408	426	.96	408
	March	742	.90	668	717	.93	668
	April	725	.90	653	667	.98	653
	May	705	.92	649	666	.98	650
	June	822	.92	756	779	.97	755
	July	900	.91	819	857	.95	818
	Aug.	710	.91	646	664	.97	647
	Sept.	606	.90	545	564	.97	546
	Oct.	412	.90	371	371	1.00	371
	Nov.	319	.94	300	276	1.09	300
	Dec.	202	.94	190	159	1.19	190
	Total	6,975	.91	6,350	6,516	.97	6,351
1962	Jan.	334	.93	310	323	.95	308
	Feb.	374	.92	344	345	.99	342
	March	692	.92	637	665	.95	635
	April	756	1/ .94	711	696	1.02	709
	May	686	1/ .95	652	646	1.01	651
	June	778	.97	755	734	1.03	753
	July	882	.95	838	838	1.00	836
	Aug.	821	.97	796	774	1.03	795
	Sept.	644	.95	612	602	1.02	611
	Oct.	471	.96	452	430	1.05	449
	Nov.	434	.96	417	391	1.06	414
	Dec.	287	1.00	286	244	1.16	283
	Total	7,159	1/ .95	6,810	6,688	1.01	6,786
1963	Jan.	350	.99	346	346	.98	341
	Feb.	467	.98	458	445	1.02	453
	March	735	.97	713	715	.99	708
	April	690	.97	670	637	1.04	665
	May	708	.95	672	675	.99	668
	June	840	.93	781	803	.97	776
	July	933	.90	840	896	.93	836
	Aug.	819	.89	729	779	.93	726
	Sept.	630	.87	561	594	.94	556
	Oct.	438	.87	381	402	.94	377
	Nov.	334	.88	294	296	.98	290
	Dec.	307	.89	273	269	1.00	269
	Total	7,251	.93	6,718	6,857	.97	6,667
1964	Jan.	363	.90	327	376	.87	327
	Feb.	479	.90	432	473	.91	432
	March	640	.89	570	635	.90	570
	April	652	.89	581	615	.94	581
	May	598	.91	544	580	.94	546
	June	742	.93	690	720	.96	691
	July	864	.94	812	842	.97	813
	Aug.	795	.94	747	770	.97	749
	Sept.	589	.92	542	568	.96	543
	Oct.	409	.96	394	387	.97	375
	Nov.	275	.96	264	253	1.02	257
	Dec.	245	1.00	244	223	1.09	244
	Total	6,651	.92	6,147	6,442	.95	6,128

1/ Partially estimated.

Table 17

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Parker Dam, Arizona-California

Units – 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	290	0.98	284	331	0.85	284
	Feb.	423	.99	419	427	.98	419
	March	634	1.00	634	646	.98	634
	April	581	1.01	587	574	1.02	587
	May	604	1.06	640	595	1.08	640
	June	710	1.05	746	702	1.06	747
-1965	July	846	1.06	897	829	1.08	898
	Aug.	867	1.06	919	860	1.07	920
	Sept.	599	1.05	629	592	1.07	630
	Oct.	385	1.08	416	378	1.10	416
	Nov.	220	1.08	237	214	1.11	237
	Dec.	197	1.05	207	175	1.18	207
	Total	6,356	1.04	6,615	6,323	1.05	6,619
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	April						
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	Sept.						
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	Nov.						
	Dec.						
	Total						
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	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	Oct.						
	Nov.						
	Dec.						
	Total						
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	Feb.						
	March						
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	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	177	0.82	145	177	0.82	145
	Feb.	413	1.04	430	413	1.04	430
	March	604	1.08	652	604	1.08	652
	April	729	1.06	773	729	1.06	773
	May	699	1.05	734	699	1.05	734
	June	790	1.03	814	790	1.03	814
-1966	July	901	1.03	928	901	1.03	928
	Aug.	852	1.02	869	852	1.02	869
	Sept.	585	1.00	585	585	1.00	585
	Oct.	357	1.00	357	357	1.00	357
	Nov.	256	1.00	256	256	1.00	256
	Dec.	320	1.00	320	320	1.00	320
	Total	6,683	1.03	6,863	6,683	1.03	6,863
	Jan.						
	Feb.						
	March						
	April						
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	Nov.						
	Dec.						
	Total						
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	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 17

Colorado River Basin
Flow and Quality of Water Data
Colorado River below Parker Dam, Arizona – California

(Annual Summary)

Units —1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	14,749	1.02	15,052	12,682	1.11	14,099
1942	15,195	.96	14,662	13,055	1.05	13,769
1943	12,079	.90	10,858	10,061	.99	10,009
1944	13,842	.91	12,596	11,847	.99	11,787
1945	12,033	.90	10,808	10,049	.99	9,987
1946	10,141	.89	9,075	8,246	1.00	8,285
1947	10,663	.91	9,725	8,557	1.04	8,899
1948	12,651	.88	11,144	10,840	.96	10,421
1949	13,060	.82	10,716	11,141	.90	10,000
1950	10,473	.84	8,801	8,849	.92	8,094
1951	8,672	.88	7,612	7,094	.97	6,914
1952	15,413	.83	12,838	12,957	.88	11,438
1953	10,649	.84	8,944	9,144	.90	8,261
1954	9,671	.89	8,584	8,357	.95	7,969
1955	8,141	1.01	8,255	6,903	1.10	7,588
1956	6,869	1.10	7,532	6,427	1.18	7,556
1957	7,997	1.04	8,288	6,939	1.13	7,819
1958	10,892	.86	9,412	9,809	.91	8,975
1959	8,186	.83	6,786	7,332	.88	6,464
1960	7,794	.86	6,696	7,127	.91	6,523
1961	6,975	.91	6,350	6,516	.97	6,351
1962	7,159	1/ .95	6,810	6,688	1.01	6,786
1963	7,251	.93	6,718	6,857	.97	6,667
1964	6,651	.92	6,147	6,442	.95	6,128
1965	6,356	1.04	6,615	6,323	1.05	6,619
1966	6,683	1.03	6,863	6,683	1.03	6,863
Total	260,245		237,887	226,925		224,271
Average	10,009	0.91	9,149	8,728	0.99	8,626

1/ Partially estimated.

Records furnished by Metropolitan Water District of Southern California.

Table 18

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Imperial Dam, Arizona - California

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	642	1.10	706	509	1.24	629
	Feb.	535	1.15	615	364	1.50	545
	March	743	.90	669	544	1.12	608
	April	562	1.04	584	331	1.57	520
	May	1,150	1.11	1,277	940	1.29	1,215
	June	1,605	1.21	1,942	1,386	1.36	1,888
-1941	July	965	1.17	1,129	743	1.45	1,078
	Aug.	1,192	1.09	1,299	967	1.29	1,243
	Sept.	1,444	.99	1,430	1,232	1.11	1,368
	Oct.	1,505	1.02	1,535	1,318	1.11	1,461
	Nov.	1,671	1.02	1,704	1,482	1.10	1,627
	Dec.	2,010	1.04	2,090	1,824	1.10	2,012
	Total	14,024	1.07	14,980	11,640	1.22	14,194
	Jan.	1,876	1.08	2,026	1,737	1.12	1,953
	Feb.	1,590	1.09	1,733	1,413	1.18	1,666
	March	1,476	1.09	1,609	1,273	1.22	1,550
	April	1,080	1.11	1,199	844	1.35	1,137
	May	1,524	1.10	1,676	1,311	1.23	1,618
	June	1,465	1.11	1,626	1,244	1.27	1,575
-1942	July	1,199	1.11	1,331	976	1.31	1,283
	Aug.	844	1.09	920	617	1.41	868
	Sept.	742	1.11	824	526	1.46	767
	Oct.	761	1.08	822	570	1.32	754
	Nov.	981	1.03	1,010	787	1.19	939
	Dec.	1,176	.97	1,141	986	1.08	1,069
	Total	14,714	1.08	15,917	12,284	1.24	15,179
	Jan.	1,011	.94	950	881	1.00	881
	Feb.	729	.92	671	562	1.07	608
	March	846	.95	804	652	1.15	750
	April	802	.96	770	576	1.24	712
	May	842	.98	825	638	1.21	772
	June	876	.98	858	664	1.22	812
-1943	July	972	.95	923	757	1.16	880
	Aug.	910	.94	855	693	1.17	808
	Sept.	917	.94	862	711	1.14	809
	Oct.	1,094	.94	1,028	913	1.06	963
	Nov.	1,124	.93	1,045	940	1.04	977
	Dec.	1,222	.89	1,088	1,041	.98	1,019
	Total	11,345	.94	10,679	9,028	1.11	9,991
	Jan.	1,209	.89	1,076	1,082	.93	1,010
	Feb.	1,216	.94	1,143	1,051	1.03	1,083
	March	1,289	.97	1,250	1,098	1.09	1,199
	April	1,126	1.00	1,126	902	1.19	1,071
	May	1,055	1.01	1,066	856	1.19	1,016
	June	900	1.02	918	693	1.26	876
-1944	July	920	.99	911	710	1.23	871
	Aug.	1,041	.97	1,010	827	1.17	966
	Sept.	1,041	.94	979	837	1.11	928
	Oct.	1,123	.92	1,033	944	1.03	971
	Nov.	1,142	.89	1,016	959	.99	951
	Dec.	1,143	.89	1,017	964	.99	951
	Total	13,205	.95	12,545	10,923	1.09	11,893
	Jan.	1,160	.99	1,137	1,035	1.03	1,071
	Feb.	1,047	.97	1,016	885	1.08	956
	March	1,193	.97	1,157	1,006	1.10	1,105
	April	947	.98	928	726	1.20	873
	May	905	1.00	905	706	1.21	852
	June	860	.99	851	654	1.23	805
-1945	July	817	.96	784	609	1.22	741
	Aug.	718	.94	675	506	1.24	628
	Sept.	745	.92	685	544	1.16	633
	Oct.	912	.88	803	734	1.01	738
	Nov.	1,011	.89	900	829	1.01	834
	Dec.	1,075	.93	1,000	897	1.04	933
	Total	11,390	.95	10,841	9,131	1.11	10,169
	Jan.	1,008	.94	948	889	1.00	884
	Feb.	1,005	.92	925	849	1.02	866
	March	927	.94	871	747	1.10	821
	April	759	.96	729	546	1.24	675
	May	786	.98	770	597	1.21	720
	June	658	.99	651	462	1.31	607
-1946	July	719	.97	697	522	1.26	656
	Aug.	666	.94	626	469	1.24	581
	Sept.	639	.95	607	447	1.25	558
	Oct.	707	.97	686	537	1.26	624
	Nov.	757	.96	727	583	1.14	663
	Dec.	855	.94	804	685	1.08	739
	Total	9,486	.95	9,041	7,333	1.14	8,394
	Jan.	933	0.95	[illegible]	797	1.03	819
	Feb.	872	.95	[illegible]	701	1.09	766
	March	934	.98	[illegible]	741	1.16	860
	April	737	1.02	[illegible]	510	1.36	694
	May	827	1.01	[illegible]	622	1.26	780
	June	787	1.02	[illegible]	578	1.30	754
-1947	July	743	1.01	[illegible]	532	1.32	704
	Aug.	830	.99	[illegible]	614	1.26	772
	Sept.	733	1.00	733	537	1.26	678
	Oct.	753	.95	715	566	1.15	650
	Nov.	851	.90	766	660	1.06	698
	Dec.	1,041	.87	906	853	.98	839
	Total	10,041	.97	9,711	7,711	1.17	9,014
	Jan.	1,106	.97	1,073	995	1.02	1,013
	Feb.	1,135	.94	1,067	990	1.02	1,012
	March	1,092	.95	1,037	925	1.07	990
	April	1,007	.94	947	806	1.11	896
	May	1,051	.95	998	874	1.09	950
	June	916	.95	870	735	1.12	827
-1948	July	1,003	.95	953	821	1.11	914
	Aug.	906	.94	852	718	1.13	810
	Sept.	871	.91	793	690	1.08	747
	Oct.	901	.89	802	740	1.01	745
	Nov.	945	.86	813	778	.97	755
	Dec.	1,103	.94	1,037	939	1.04	979
	Total	12,036	.93	11,242	10,011	1.06	10,638
	Jan.	1,237	.92	1,138	1,117	.97	1,079
	Feb.	1,183	.88	1,041	1,029	.96	987
	March	1,226	.88	1,079	1,051	.98	1,031
	April	1,084	.91	986	875	1.07	935
	May	927	.92	853	740	1.16	806
	June	871	.93	810	681	1.13	768
-1949	July	860	.92	791	669	1.12	751
	Aug.	934	.88	822	737	1.06	779
	Sept.	996	.86	857	808	1.00	810
	Oct.	1,103	.83	915	933	.92	858
	Nov.	1,000	.93	930	825	1.06	872
	Dec.	1,146	.77	882	974	.85	825
	Total	12,567	.88	11,104	10,439	1.01	10,501
	Jan.	1,088	.89	968	994	.92	910
	Feb.	994	.87	865	865	.94	811
	March	1,169	.88	1,029	1,023	.96	981
	April	936	.90	842	754	1.05	790
	May	1,002	.91	912	843	1.02	864
	June	841	.89	748	682	1.03	703
-1950	July	822	.89	732	662	1.04	690
	Aug.	758	.88	667	590	1.06	623
	Sept.	643	.87	559	483	1.06	511
	Oct.	603	.94	567	459	1.11	509
	Nov.	510	.95	485	360	1.18	427
	Dec.	540	.95	513	393	1.16	454
	Total	9,906	.90	8,887	8,108	1.02	8,273
	Jan.	558	.95	530	468	1.01	472
	Feb.	498	.96	478	374	1.13	424
	March	635	.96	610	497	1.13	559
	April	744	.96	714	570	1.16	661
	May	606	.99	600	455	1.21	550
	June	703	.98	689	554	1.16	642
-1951	July	820	.98	804	670	1.13	759
	Aug.	853	.95	810	694	1.10	763
	Sept.	697	.93	648	545	1.10	599
	Oct.	682	.96	655	544	1.10	599
	Nov.	559	.97	542	414	1.17	485
	Dec.	698	.98	684	556	1.13	626
	Total	8,053	.96	7,764	6,341	1.13	7,139
	Jan.	1,058	.95	1,005	835	.99	824
	Feb.	1,107	.96	1,063	816	1.04	845
	March	1,424	.92	1,310	1,170	.99	1,159
	April	1,279	.97	1,241	1,044	1.09	1,138
	May	1,345	1.00	1,345	1,159	1.09	1,268
	June	1,309	.99	1,296	1,149	1.09	1,248
-1952	July	1,182	.97	1,147	964	1.07	1,031
	Aug.	1,178	.92	1,084	957	1.02	979
	Sept.	1,219	.87	1,061	1,013	.95	968
	Oct.	1,240	.84	1,042	1,092	.91	988
	Nov.	1,176	.78	917	1,002	.84	843
	Dec.	1,298	.75	974	1,104	.80	880
	Total	14,815	.91	13,485	12,305	.99	12,171

Table 18

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Imperial Dam, Arizona - California

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	1,216	0.77	936	1,131	0.78	879
	Feb.	1,022	.89	910	904	.95	857
	March	911	.95	865	779	1.04	814
	April	756	1.01	764	588	1.21	712
	May	856	1.01	865	712	1.15	815
	June	811	1.00	811	668	1.14	761
-1953	July	980	.96	941	837	1.07	893
	Aug.	931	.95	884	779	1.07	836
	Sept.	776	.93	722	630	1.07	672
	Oct.	644	.96	618	512	1.10	562
	Nov.	522	.97	506	383	1.17	450
	Dec.	620	.95	589	484	1.10	532
	Total	10,045	.94	9,411	8,407	1.04	8,783
	Jan.	783	.94	736	714	.96	685
	Feb.	661	.94	621	559	1.03	574
	March	723	.94	680	606	1.05	635
	April	773	.94	727	621	1.10	681
	May	929	1.05	975	801	1.16	932
	June	804	1.03	828	677	1.16	786
-1954	July	885	1.01	894	758	1.12	853
	Aug.	887	1.03	914	750	1.16	871
	Sept.	719	1.02	733	589	1.17	688
	Oct.	620	1.03	639	504	1.17	589
	Nov.	602	1.02	614	479	1.18	563
	Dec.	644	1.03	663	524	1.17	611
	Total	9,030	1.00	9,024	7,582	1.12	8,468
	Jan.	739	1.00	739	677	1.01	683
	Feb.	593	1.03	611	500	1.12	559
	March	678	1.07	725	573	1.18	675
	April	716	1.09	780	574	1.27	729
	May	729	1.13	824	610	1.27	774
	June	746	1.20	895	632	1.34	846
-1955	July	882	1.21	1,067	767	1.33	1,019
	Aug.	811	1.18	957	685	1.33	910
	Sept.	638	1.17	746	518	1.35	698
	Oct.	499	1.20	599	389	1.40	544
	Nov.	379	1.24	470	263	1.57	414
	Dec.	298	1.29	384	184	1.78	328
	Total	7,708	1.14	8,797	6,372	1.28	8,179
	Jan.	298	1.31	390	361	1.27	458
	Feb.	344	1.24	427	410	1.31	538
	March	546	1.24	677	548	1.33	726
	April	646	1.23	795	557	1.42	792
	May	594	1.26	748	504	1.43	723
	June	666	1.25	833	557	1.41	782
-1956	July	753	1.25	941	701	1.37	961
	Aug.	717	1.22	875	648	1.36	883
	Sept.	583	1.24	723	511	1.40	714
	Oct.	479	1.24	594	375	1.43	536
	Nov.	343	1.28	439	252	1.58	399
	Dec.	297	1.30	386	230	1.59	366
	Total	6,266	1.25	7,828	5,654	1.39	7,878
	Jan.	258	1.36	351	212	1.47	311
	Feb.	314	1.32	414	236	1.59	377
	March	520	1.23	640	430	1.41	604
	April	667	1.18	787	541	1.39	750
	May	581	1.19	691	480	1.37	658
	June	651	1.19	775	552	1.34	743
-1957	July	794	1.22	969	696	1.35	938
	Aug.	759	1.08	820	649	1.21	788
	Sept.	616	1.12	690	512	1.28	656
	Oct.	511	1.16	593	418	1.33	555
	Nov.	695	1.14	792	594	1.27	753
	Dec.	978	1.10	1,076	880	1.18	1,037
	Total	7,344	1.17	8,598	6,200	1.32	8,170
	Jan.	1,299	1.05	1,364	1,250	1.06	1,328
	Feb.	637	1.07	682	556	1.17	649
	March	1,253	1.06	1,328	1,162	1.12	1,296
	April	1,280	1.02	1,306	1,152	1.10	1,273
	May	1,016	1.00	1,016	912	1.08	984
	June	769	1.01	777	669	1.11	746
-1958	July	812	.96	780	713	1.05	751
	Aug.	802	.97	778	693	1.08	748
	Sept.	655	.97	635	551	1.10	603
	Oct.	624	1.01	630	530	1.12	594
	Nov.	592	1.00	592	489	1.13	555
	Dec.	761	.97	738	661	1.06	701
	Total	10,500	1.01	10,626	9,338	1.10	10,228

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	674	0.99	667	[illegible]	0.99	639
	Feb.	592	.99	586	[illegible]	1.06	562
	March	618	1.02	630	[illegible]	1.11	607
	April	770	1.01	778	[illegible]	1.14	753
	May	646	1.05	678	[illegible]	1.17	656
	June	679	1.03	699	[illegible]	1.13	678
-1959	July	824	.99	816	[illegible]	1.07	796
	Aug.	821	1.04	854	732	1.14	834
	Sept.	644	1.04	670	559	1.16	649
	Oct.	565	1.03	582	490	1.13	555
	Nov.	421	1.04	438	338	1.21	411
	Dec.	441	1.01	445	361	1.16	418
	Total	7,695	1.02	7,843	6,769	1.12	7,558
	Jan.	449	1.02	458	435	1.02	444
	Feb.	436	1.00	436	391	1.08	424
	March	651	.99	644	595	1.06	632
	April	762	.99	754	670	1.11	741
	May	650	1.07	696	583	1.18	686
	June	736	1.07	788	673	1.15	778
-1960	July	845	1.07	904	783	1.14	896
	Aug.	777	1.06	824	703	1.16	815
	Sept.	606	1.09	661	536	1.22	651
	Oct.	481	1.10	529	421	1.23	515
	Nov.	360	1.14	410	292	1.36	396
	Dec.	354	1.15	407	289	1.36	393
	Total	7,107	1.06	7,511	6,371	1.16	7,371
	Jan.	342	1.18	404	346	1.17	404
	Feb.	400	1.15	460	373	1.24	463
	March	648	1.10	713	611	1.17	716
	April	666	1.08	719	592	1.22	721
	May	618	1.14	705	568	1.25	709
	June	691	1.08	746	646	1.16	750
-1961	July	755	1.09	823	711	1.16	828
	Aug.	671	1.12	752	615	1.23	757
	Sept.	541	1.14	617	489	1.27	621
	Oct.	427	1.10	470	384	1.22	470
	Nov.	312	1.12	349	262	1.33	349
	Dec.	222	1.18	262	174	1.50	262
	Total	6,293	1.12	7,020	5,771	1.22	7,050
	Jan.	337	1.11	374	339	1.10	372
	Feb.	304	1.14	347	276	1.26	347
	March	597	1.06	633	560	1.13	634
	April	689	1.06	730	614	1.19	729
	May	619	1.11	688	569	1.21	690
	June	648	1.12	725	605	1.20	726
-1962	July	741	1.11	822	697	1.18	824
	Aug.	730	1.12	818	675	1.07	721
	Sept.	593	1.11	658	543	1.21	660
	Oct.	458	1.15	527	416	1.26	524
	Nov.	439	1.16	509	389	1.30	506
	Dec.	303	1.18	358	255	1.39	355
	Total	6,458	1.11	7,189	5,938	1.19	7,088
	Jan.	337	1.14	384	346	1.09	379
	Feb.	393	1.11	436	373	1.16	433
	March	615	1.10	676	585	1.15	673
	April	647	1.09	705	580	1.21	701
	May	602	1.09	656	561	1.17	654
	June	691	1.06	733	655	1.12	731
-1963	July	775	1.04	806	740	1.09	806
	Aug.	757	1.02	772	710	1.09	772
	Sept.	595	1.04	619	552	1.12	618
	Oct.	461	1.08	498	424	1.16	494
	Nov.	340	1.12	381	295	1.28	377
	Dec.	309	1.13	350	266	1.30	346
	Total	6,522	1.08	7,016	6,087	1.15	6,984
	Jan.	337	1.12	377	361	1.04	377
	Feb.	415	1.07	444	410	1.09	446
	March	562	1.06	595	548	1.09	597
	April	609	1.07	652	557	1.17	653
	May	530	1.10	583	504	1.16	587
	June	576	1.15	663	557	1.20	666
-1964	July	719	1.09	784	701	1.12	788
	Aug.	679	1.09	740	648	1.15	745
	Sept.	539	1.14	615	511	1.21	618
	Oct.	396	1.22	483	375	1.29	483
	Nov.	281	1.26	354	252	1.40	354
	Dec.	257	1.27	326	230	1.42	326
	Total	5,900	1.12	6,616	5,654	1.17	6,640

Table 18

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Imperial Dam, Arizona - California

Units — 1000

Year	Month	Historical Flow (A.F.)	Historical Concen-tration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concen-tration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	271	1.26	341	316	1.08	341
	Feb.	332	1.26	418	338	1.24	420
	March	548	1.20	658	558	1.18	659
	April	566	1.15	651	549	1.19	652
	May	548	1.22	669	533	1.26	670
	June	558	1.22	680	549	1.24	683
- 1965	July	709	1.26	893	692	1.30	898
	Aug.	737	1.28	943	730	1.30	947
	Sept.	540	1.31	708	531	1.34	709
	Oct.	400	1.29	516	392	1.31	516
	Nov.	257	1.33	342	246	1.39	342
	Dec.	237	1.22	290	206	1.41	290
	Total	5,703	1.25	7,109	5,640	1.26	7,127
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
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	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Year	Month	Historical Flow (A.F.)	Historical Concen-tration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concen-tration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	203	1.13	229	203	1.13	229
	Feb.	334	1.21	[illegible]	334	1.21	404
	March	517	1.21	[illegible]	517	1.21	626
	April	622	1.22	[illegible]	622	1.22	758
	May	576	1.24	715	576	1.24	715
	June	637	1.31	835	637	1.31	835
- 1966	July	729	1.20	[illegible]	729	1.20	874
	Aug.	733	1.18	865	733	1.18	865
	Sept.	532	1.21	[illegible]	532	1.21	643
	Oct.	389	1.23	478	389	1.23	478
	Nov.	263	1.28	337	263	1.28	337
	Dec.	314	1.18	369	314	1.18	369
	Total	5,849	1.22	7,133	5,849	1.22	7,133
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
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	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
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	Dec.						
	Total						
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	July						
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	Oct.						
	Nov.						
	Dec.						
	Total						
	Jan.						
	Feb.						
	March						
	April						
	May						
	June						
	July						
	Aug.						
	Sept.						
	Oct.						
	Nov.						
	Dec.						
	Total						

Table 18

Colorado River Basin
Flow and Quality of Water Data
Colorado River at Imperial Dam, Arizona — California
(Annual Summary)

Units — 1000

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	14,024	1.07	14,980	11,640	1.22	14,194
1942	14,714	1.08	15,917	12,284	1.24	15,179
1943	11,345	.94	10,679	9,028	1.11	9,991
1944	13,205	.95	12,545	10,923	1.09	11,893
1945	11,390	.95	10,841	9,131	1.11	10,169
1946	9,486	.95	9,041	7,333	1.14	8,394
1947	10,041	.97	9,711	7,711	1.17	9,014
1948	12,036	.93	11,242	10,011	1.06	10,638
1949	12,567	.88	11,104	10,439	1.01	10,501
1950	9,906	.90	8,887	8,108	1.02	8,273
1951	8,053	.96	7,764	6,341	1.13	7,139
1952	14,815	.91	13,485	12,305	.99	12,171
1953	10,045	.94	9,411	8,407	1.04	8,783
1954	9,030	1.00	9,024	7,582	1.12	8,468
1955	7,708	1.14	8,797	6,372	1.28	8,179
1956	6,266	1.25	7,828	5,654	1.39	7,878
1957	7,344	1.17	8,598	6,200	1.32	8,170
1958	10,500	1.01	10,626	9,338	1.10	10,228
1959	7,695	1.02	7,843	6,769	1.12	7,558
1960	7,107	1.06	7,511	6,371	1.16	7,371
1961	6,293	1.12	7,020	5,771	1.22	7,050
1962	6,458	1.11	7,189	5,938	1.19	7,088
1963	6,522	1.08	7,016	6,087	1.15	6,984
1964	5,900	1.12	6,616	5,654	1.17	6,640
1965	5,703	1.25	7,109	5,640	1.26	7,127
1966	5,849	1.22	7,133	5,849	1.22	7,133
Total	244,002		247,917	206,886		236,213
Average	9,385	1.02	9,535	7,957	1.14	9,085

Table 19

Summary of Anticipated Effects of Additional Developments on Quality of Water at Nineteen Stations

Colorado River Basin

(Units: 1,000 except concentrations)

Station	Present modified condition: Flow (AF)	Concentration (T/AF)	T.D.S. (T)	Effects of storage unit operation - Increment No. 1: Flow adjustment (AF)		Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)
1	2	3	4	5		6	7	8	9
Green River at Green River, Wyoming	1,209	0.43	542						
Green River near Greendale, Utah	1,479	0.57	842	94	Flaming Gorge Unit	1,573	0.57	54	896
Duchesne River near Randlett, Utah	414	0.97	402						
Green River near Ouray, Utah	3,944	0.54	2,146	94	Flaming Gorge Unit	4,038	0.54	54	2,200
Green River at Green River, Utah	3,975	0.63	2,518	94	Flaming Gorge Unit	4,069	0.63	54	2,572
San Rafael River near Green River, Utah	96	2.21	212						
Colorado River near Glenwood Springs, Colorado	1,475	0.40	589						
Colorado River near Cameo, Colorado	2,636	0.58	1,524						
Gunnison River near Grand Junction, Colorado	1,704	0.86	1,473	4	Curecanti Unit	1,708	0.86	1	1,474
Colorado River near Cisco, Utah	4,815	0.88	4,230	4	Curecanti Unit	4,819	0.88	1	4,231
San Juan River near Archuleta, New Mexico	938	0.22	203	-2	Navajo Unit	936	0.22	0	203
San Juan River near Bluff, Utah	1,598	0.62	993	-2	Navajo Unit	1,596	0.62	0	993
Colorado River at Lees Ferry, Arizona	10,227	0.80	8,155	239	Increment No. 1	10,466	0.80	169	8,324
Colorado River near Grand Canyon, Arizona	10,494	0.88	9,296	239	Increment No. 1	10,733	0.88	169	9,465
Virgin River at Littlefield, Arizona	154	2.26	348						
Colorado River below Hoover Dam, Ariz.-Nev.	10,291	1.00	10,277	78	Increment No. 1	10,369	0.99	9	10,286
Colorado River above Parker Dam, Ariz.-Calif.	9,874	0.99	9,759	134	Increment No. 1	10,008	0.98	64	9,823
Colorado River below Parker Dam, Ariz.-Calif.	8,728	0.99	8,626	134	Increment No. 1	8,862	0.98	72	8,698
Colorado River at Imperial Dam, Ariz.-Calif.	7,957	1.14	9,088	134	Increment No. 1	8,091	1.13	72	9,160

Station		Effects of developments - Increment No. 2, Zero pickup: Flow adjustment (AF)	Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	Concentration (T/AF)	T.D.S. (T)
1		10	11	12	13	14	15	16	17
Green River at Green River, Wyoming	Seedskadee	-165	1,104	0.49	0	542	118	0.60	660
Green River near Greendale, Utah	Seedskadee, Lyman, Westvaco, and other M&I	-211	1,362	0.66	0	896	118	0.74	1,014
Duchesne River near Randlett, Utah	Central Utah (Bonneville, Upalco)	-176	238	1.58	-27	375	0	1.58	375
Green River near Ouray, Utah	Seedskadee, Lyman, Westvaco, and other M&I Central Utah, Savery-Pot Hook, Hayden Steam Plant	-454	3,584	0.61	-27	2,173	163	0.65	2,336
Green River at Green River, Utah	Seedskadee, Lyman, Westvaco, and other M&I Central Utah, Savery-Pot Hook, Hayden Steam Plant	-454	3,615	0.70	-27	2,545	163	0.75	2,708
San Rafael River near Green River, Utah	Emery County	-17	79	2.69	0	212	2	2.71	214
Colorado River near Glenwood Springs, Colorado	Colorado east slope diversions and M&I, Green Mountain	-334	1,141	0.49	-31	558	0	0.49	558
Colorado River near Cameo, Colorado	Colorado east slope diversions and M&I Green Mountain, Silt	-340	2,296	0.65	-31	1,493	4	0.65	1,497
Gunnison River near Grand Junction, Colorado	Fruitland Mesa and Bostwick Park	-32	1,676	0.88	0	1,474	36	0.90	1,510
Colorado River near Cisco, Utah	Colorado east slope diversions and M&I, Green Mountain, Silt, Fruitland Mesa, Bostwick Park	-372	4,447	0.94	-31	4,200	40	0.95	4,240
San Juan River near Archuleta, New Mexico									
San Juan River near Bluff, Utah	Utah Construction, Expansion Hogback	-35 36 (Salvage)	1,561	0.64	0	993	0	0.64	993
Colorado River at Lees Ferry, Arizona	Increment No. 2	-842	9,624	0.86	-58	8,266	205	0.88	8,471
Colorado River near Grand Canyon, Arizona	Increment No. 2	-842	9,891	0.95	-58	9,407	205	0.97	9,612
Virgin River at Littlefield, Arizona									
Colorado River below Hoover Dam, Ariz.-Nev.	Increment No. 2	-842	9,527	1.07	-58	10,228	205	1.10	10,433
Colorado River above Parker Dam, Ariz.-Calif.	Increment No. 2	-842	9,166	1.07	-58	9,765	205	1.09	9,970
Colorado River below Parker Dam, Ariz.-Calif.	Increment No. 2	-842	8,020	1.07	-154	8,544	179	1.09	8,723
Colorado River at Imperial Dam, Ariz.-Calif.	Increment No. 2	-842	7,249	1.24	-154	9,006	179	1.27	9,185

Station		Effects of Developments - Increment No. 3, Zero pickup: Flow adjustment (AF)	Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	Concentration (T/AF)	T.D.S. (T)
1		18	19	20	21	22	23	24	25
Green River at Green River, Wyoming									
Green River near Greendale, Utah									
Duchesne River near Randlett, Utah									
Green River near Ouray, Utah									
Green River at Green River, Utah									
San Rafael River near Green River, Utah									
Colorado River near Glenwood Springs, Colorado									
Colorado River near Cameo, Colorado	Fryingpan-Arkansas	-70	2,226	0.67	-4	1,489	0	0.67	1,493
Gunnison River near Grand Junction, Colorado									
Colorado River near Cisco, Utah	Fryingpan-Arkansas	-70	4,377	0.96	-4	4,196	0	0.97	4,236
San Juan River near Archuleta, New Mexico	San Juan-Chama, Navajo Indian Irrigation	-618	318	0.22	-134	69	0	0.22	69
San Juan River near Bluff, Utah	San Juan-Chama, Navajo Indian Irrigation	-360 18 (Salvage)	1,201	0.81	-18	975	220	1.00	1,195
Colorado River at Lees Ferry, Arizona	Increment No. 3	-412	9,212	0.92	-22	8,449	220	0.94	8,669
Colorado River near Grand Canyon, Arizona	Increment No. 3	-412	9,479	0.99	-22	9,385	220	1.03	9,810
Virgin River at Littlefield, Arizona									
Colorado River below Hoover Dam, Ariz.-Nev.	Increment No. 3	-412	9,115	1.12	-22	10,206	220	1.17	10,631
Colorado River above Parker Dam, Ariz.-Calif.	Increment No. 3	-412	8,754	1.11	-22	9,743	220	1.16	10,168
Colorado River below Parker Dam, Ariz.-Calif.	Increment No. 3	-412	7,608	1.11	-77	8,467	190	1.16	8,836
Colorado River at Imperial Dam, Ariz.-Calif.		-412	6,837	1.31	-77	8,929	190	1.36	9,298

Station		Effects of Developments - Increment No. 4, Zero pickup: Flow adjustment (AF)	Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	Concentration (T/AF)	T.D.S. (T)
1		26	27	28	29	30	31	32	33
Virgin River at Littlefield, Arizona	Dixie	-48	106	3.26	-2	346	14	3.40	360
Colorado River below Hoover Dam, Ariz.-Nev.	Dixie, Southern Nevada	-301 87 (Salvage)	8,814	1.16	-2	10,204	14	1.21	10,643
Colorado River above Parker Dam, Ariz.-Calif.	Dixie, Southern Nevada Ft. Mohave and Chemehuevi Indian	-297	8,457	1.15	2	9,741	56	1.21	10,222
Colorado River below Parker Dam, Ariz.-Calif.	Central Arizona, Rest of Increment No. 4 (Above)	-1,022 114 (Salvage)	6,586	1.15	-878	7,589	5	1.21	7,963
Colorado River at Imperial Dam, Ariz.-Calif.	Central Arizona, Colorado River Indian Project, Rest of Increment No. 4 (Above)	-1,137	5,700	1.41	-878	8,031	146	1.50	8,566

Station		Effects of developments - Increment No. 5, Zero pickup: Flow Adjustment (T)	Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	Concentration (T/AF)	T.D.S. (T)
1		34	35	36	37	38	39	40	41
Duchesne River near Randlett, Utah	Uintah Unit	-31	207	1.81	0	375	16	1.89	391
Green River near Ouray, Utah	Uintah Unit Four County, Colorado; Cheyenne, Wyoming	-93	3,491	0.62	-12	2,161	16	0.67	2,340
Green River at Green River, Utah	Uintah Unit Four County, Colorado; Cheyenne, Wyoming	-93	3,522	0.72	-12	2,533	16	0.77	2,712
Colorado River near Cameo, Colorado	M&I Ruedi Reservoir and West Divide	-116	2,110	0.71	0	1,489	38	0.73	1,531
Gunnison River near Grand Junction, Colorado	Dallas Creek	-37	1,639	0.90	0	1,474	30	0.94	1,540
Colorado River near Cisco, Utah	M&I Ruedi Reservoir, West Divide, Dallas Creek, Dolores, San Miguel	-378	3,999	1.04	-35	4,161	120	1.08	4,321
San Juan River near Bluff, Utah	Animas-La Plata, Dolores	-93 29 (Salvage)	1,108	0.91	35	1,010	157	1.25	1,387
Colorado River at Lees Ferry, Arizona	Resources, Arizona M&I, Rest of Increment No. 5 (Above)	-676	8,536	1.00	-124	8,545	293	1.04	8,838
Colorado River near Grand Canyon, Arizona	Increment No. 5	-676	8,803	1.05	-124	9,261	293	1.13	9,979
Colorado River below Hoover Dam, Ariz.-Nev.	Increment No. 5	-676	8,138	1.24	-124	10,080	293	1.33	10,812
Colorado River above Parker Dam, Ariz.-Calif.	Increment No. 5	-676	7,781	1.24	-124	9,617	293	1.34	10,391
Colorado River below Parker Dam, Ariz.-Calif.	Increment No. 5	0	6,586	1.24	555	8,144	282	1.34	8,800
Colorado River at Imperial Dam, Ariz.-Calif.	Increment No. 5	0	5,700	1.51	555	8,606	282	1.65	9,403

Note: Computations of Increment No. 4 at the "Below Parker Dam and at Imperial Dam" stations assume Central Arizona Project's temporary use of Increment No. 5 water.

Table 20
PROJECTS DEPLETING COLORADO RIVER WATER

Increment No. 1
Storage Units of the Colorado River Storage Project

Storage unit	Average annual depletion (evaporation) (reservoir losses--ac.-ft.)1/
Glen Canyon	533,000
Flaming Gorge	54,000
Navajo	30,000
Curecanti	15,000
Subtotal	632,000

Project and state	New depletion (ac.-ft.)	New irrigation land (acres)
Increment No. 2 — Participating projects and other miscellaneous projects		
Lyman, Wyoming	10,000	0
Silt, Colorado	6,000	2,400
Emery County, Utah	17,000	770
Seedskadee, Wyoming	165,000	58,775
Central Utah, Utah		
Bonneville Unit	2/166,000	3/
Jensen Unit	17,000	440
Upalco Unit	10,000	0
Denver, Englewood, Colorado Springs, and Pueblo Diversions	234,000	3/
M&I Green Mountain	12,000	
Independence Pass Expansion	14,000	3/
Homestake Project, Colorado	74,000	3/
Hayden Steamplant	12,000	4/
Bostwick Park, Colorado	4,000	1,610
Savery-Pot Hook, Wyoming-Colorado	38,000	21,920
Fruitland Mesa, Colorado	28,000	15,870
Expansion Hogback	10,000	0
Utah Construction Co., New Mexico	25,000	4/
Westvaco) Utah Power & Light Co., Wyoming)	36,000	4/
Subtotal	878,000	101,785
Salvage	-36,000	0
Subtotal	842,000	101,785
Increment No. 3 — San Juan-Chama, Navajo Indian Irrigation, and Fryingpan-Arkansas Projects		
San Juan-Chama, Colorado-New Mexico	110,000	3/
Navajo Indian Irrigation, New Mexico	250,000	110,000
Fryingpan-Arkansas, Colorado	70,000	3/
Subtotal	430,000	110,000
Salvage	-18,000	0
Subtotal	412,000	110,000
Increment No. 4 — Lower Basin Projects		
Central Arizona, Arizona	{(725,000) 49,000	5/
Colorado River Indian, Arizona-California	229,000	70,600
Fort Mohave and Chemehuevi Indian, Arizona-California-Nevada	83,000	20,900
Dixie Project, Utah	48,000	6,900
Southern Nevada Water, Nevada	253,000	4/
Subtotal	{(1,338,000) 662,000	5/ 98,400
Salvage	-201,000	
Subtotal	{(1,137,000) 461,000	5/ 98,400
Increment No. 5 — Current Upper Basin Proposals		
M&I Ruedi Reservoir, Colorado	40,000	4/
Four County, Colorado	40,000	3/
San Miguel, Colorado	85,000	26,000
Cheyenne, Wyoming	22,000	3/
West Divide, Colorado	76,000	19,000
Animas-La Plata, Colorado-New Mexico	146,000	46,500
Dolores, Colorado	87,000	32,000
Dallas Creek, Colorado	37,000	15,000
Resources, Inc., Utah	102,000	4/
Uintah Unit, Utah	31,000	7,800
Arizona M&I, Arizona	39,000	4/
Subtotal	705,000	146,300
Salvage	-29,000	
Subtotal	676,000	146,300
Total Colorado River	3,023,000	456,485

1/ Figures show future evaporation losses. Present (1966) losses for the storage units were estimated as 314,000 acre-feet.

2/ 30,000 acre-feet to be depleted in Uinta Basin.

3/ Transmountain diversion.

4/ Inbasin depletion without irrigated land.

5/ Assumed that new depletions by the Central Arizona Project would be 725,000 acre-feet initially, 676,000 acre-feet of the water used belonging to Increment No. 5 users. As Increment No. 5 gradually uses this water, Central Arizona Project would be cut back until they have only 49,000 acre-feet of new depletions. In addition to these waters, Central Arizona Project would use 596,000 acre-feet of Metropolitan Water District's present use, cutting the District back to 550,000 acre-feet. Total Central Arizona Project depletion would be 1,321,000 acre-feet initially and 645,000 acre-feet ultimately.

Table 21

Units: 1,000 1/ Dissolved constituent loads of **Green River near Green River, Wyoming**

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$K \times 10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	1,109	4	3	3	5	4	1			527	353
1942	1,154	5	3	3	5	4	1			518	331
1943	1,680	6	3	3	7	5	1			641	279
1944	1,265	5	3	3	5	4	1			536	309
1945	1,150	4	3	3	5	4	1			519	331
1946	1,225	5	3	3	5	4	1			564	338
1947	1,926	6	4	3	8	5	1			714	272
1948	1,113	4	3	3	5	4	1			510	338
1949	1,205	5	3	3	5	4	1			541	331
1950	2,096	7	4	4	9	5	1			794	279
1951	1,972	7	4	3	8	5	1			716	265
1952	1,496	5	3	3	6	5	1	0.9	458	597	294
1953	1,084	4	3	2	4	4	1	.9	485	465	316
1954	1,183	4	3	2	4	4	1	.8	442	462	287
1955	837	3	2	2	3	4	1	1.1	511	381	338
1956	1,621	6	3	3	7	4	1	.7	438	612	279
1957	1,548	5	3	3	6	4	1	.9	437	594	279
1958	1,046	4	2	3	4	4	1	1.1	511	474	331
1959	953	4	2	2	4	4	1	1.0	493	415	323
1960	698	3	2	2	3	3	1	1.2	524	329	345
1961	559	2	1	2	2	2	1	1.2	496	243	316
1962	1,451	5	2	2	6	4	0	.8	446	545	279
1963	1,002	3	2	2	4	3	0	1.1	481	412	301
1964	1.136	4	2	2	4	3	0	.9	451	458	294
1965	1,964	7	4	3	7	6	1	.9	499	861	323
1966	911	3	2	2	3	4	0	1.3	584	473	382
Total	33,384	120	72	69	134	106	22	-	-	13,901	-
Mean	1,284	5	3	3	5	4	1	-	-	535	306

Table 22

Units: 1,000 1/ Dissolved constituent loads of **Green River near Greendale, Utah**

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$K \times 10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	1,521	8	5	5	7	9	2			957	463
1942	1,517	8	5	5	7	8	2			959	463
1943	2,089	8	5	5	8	8	1			928	323
1944	1,672	8	4	5	8	8	1			903	397
1945	1,497	7	4	5	7	7	1			826	404
1946	1,547	7	4	4	7	7	1			799	382
1947	2,447	9	5	6	11	8	2			1,143	345
1948	1,458	6	4	4	6	6	1			768	390
1949	1,583	8	5	5	8	8	2			969	448
1950	2,625	11	6	6	12	9	2			1,244	345
1951	2,334	9	6	5	11	8	2			1,118	353
1952	2,149	9	5	6	9	9	2			1,117	382
1953	1,282	6	4	4	6	6	1			725	419
1954	1,249	5	3	4	5	5	1			591	345
1955	1,021	4	3	4	4	5	1			538	390
1956	1,894	7	4	4	8	6	1			774	301
1957	2,020	8	5	5	9	8	1			1,011	368
1958	1,315	5	3	4	6	6	1			677	382
1959	1,190	5	3	4	5	6	1	1.4	631	687	426
1960	973	4	3	3	4	5	1	1.5	658	563	426
1961	781	4	2	3	4	4	1	1.5	649	460	434
1962	2,019	8	4	5	8	7	1	1.3	584	1,024	375
1963	170	1	1	1	1	1	0	1.8	842	133	573
1964	1,258	5	3	4	5	6	1	1.5	675	770	448
1965	1,437	7	4	6	6	10	1	1.8	800	1,142	584
1966	1,189	5	4	4	5	8	1	1.5	798	889	551
Total	40,232	172	104	116	177	178	32	-	-	21,715	-
Mean	1,547	7	4	4	7	7	1	-	-	835	397

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.

Table 23

Dissolved constituent loads of Duchesne River near Randlett, Utah

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$K \times 10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	694	3	3	4	4	4	1			523	551
1942	526	3	2	3	3	4	1			463	646
1943	460	3	2	3	3	4	1			454	728
1944	698	3	3	3	4	4	1			517	544
1945	407	3	2	3	3	4	1			440	794
1946	324	2	2	3	2	4	1			375	853
1947	569	3	3	3	3	4	1			489	632
1948	298	2	2	2	2	3	1			339	838
1949	641	3	3	3	4	4	1			497	573
1950	574	3	3	3	3	4	1			497	639
1951	448	3	3	3	3	5	1			477	779
1952	1,035	4	3	4	5	5	2			619	441
1953	326	2	2	3	2	3	1			366	823
1954	188	2	2	2	2	3	1			278	1,090
1955	245	2	2	2	2	3	1			323	970
1956	303	2	2	2	2	3	1			325	786
1957	456	3	2	3	3	4	1	2.2	1,020	429	691
1958	416	2	2	2	3	3	1	1.8	935	329	581
1959	166	1	1	2	2	3	1	3.2	1,420	221	978
1960	160	1	1	2	1	2	1	2.8	1,250	192	882
1961	145	1	1	2	1	2	1	3.2	1,430	196	992
1962	505	2	2	2	3	3	1	1.9	883	409	595
1963	210	1	1	2	1	3	1	3.0	1,340	268	941
1964	356	2	1	2	2	3	1	2.3	986	341	706
1965	905	4	3	4	4	6	1	1.9	863	721	585
1966	306	2	2	2	2	3	1	2.8	1,280	379	911
Total	11,361	62	55	69	69	93	27	-	-	10,467	-
Mean	437	2	2	3	3	4	1	-	-	403	677

Table 24

Dissolved constituent loads of Green River near Ouray, Utah

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$K \times 10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	4,447	19	11	16	19	22	5			2,671	441
1942	4,535	18	11	14	18	20	5			2,544	412
1943	4,257	16	10	13	17	17	4			2,232	382
1944	4,357	16	9	13	18	17	4			2,215	375
1945	4,232	16	10	12	18	16	4			2,219	382
1946	3,462	14	8	11	16	14	4			1,902	404
1947	5,474	20	11	15	22	19	5			2,675	360
1948	3,828	14	9	11	16	15	4			1,982	382
1949	5,028	20	11	14	22	19	4			2,609	382
1950	5,446	21	12	14	24	19	4			2,777	375
1951	4,747	18	11	12	20	17	4			2,490	382
1952	6,282	25	14	17	28	23	5			3,364	397
1953	3,353	13	8	11	14	14	4			1,875	412
1954	2,679	11	6	9	11	12	3			1,495	412
1955	2,784	11	6	9	11	12	3			1,493	397
1956	4,047	14	8	10	15	13	4			1,817	331
1957	5,870	20	11	14	22	19	4			2,696	338
1958	4,105	14	8	11	16	14	4			1,916	345
1959	2,937	11	6	9	11	12	3			1,545	390
1960	2,975	10	6	9	11	11	3	1.4	560	1,474	368
1961	2,298	9	5	8	9	10	3	1.5	615	1,270	404
1962	5,574	19	10	14	21	18	4	1.3	548	2,621	345
1963	1,556	6	4	6	6	7	2	1.8	695	946	448
1964	3,255	14	7	10	14	13	3	1.4	617	1,834	412
1965	5,136	20	11	16	20	22	4	1.4	649	2,951	431
1966	2,935	12	8	11	12	17	3	1.7	712	1,928	485
Total	105,599	401	231	309	431	412	99	-	-	55,541	-
Mean	4,062	15	9	12	17	16	4	-	-	2,136	390

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.

Table 25

Dissolved constituent loads of Green River at Green River, Utah

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	4,608	21	14	20	21	28	6	1.9	*775	3,272	520
1942	4,622	20	13	17	20	25	5	1.7	*715	2,989	475
1943	4,294	17	11	15	18	21	4	1.6	*670	2,565	440
1944	4,416	18	11	16	20	21	4	1.6	682	2,581	430
1945	4,260	18	11	14	20	20	4	1.5	679	2,558	442
1946	3,519	15	9	12	17	16	4	1.6	689	2,148	449
1947	5,523	21	13	17	24	23	5	1.4	615	2,991	397
1948	3,929	16	10	13	17	18	4	1.5	647	2,271	425
1949	5,129	22	13	17	24	23	5	1.5	671	3,039	435
1950	5,476	24	14	17	27	24	5	1.4	669	3,223	432
1951	4,739	20	12	15	22	22	4	1.3	656	2,848	443
1952	6,711	30	18	22	33	31	6	1.4	692	4,173	458
1953	3,333	15	10	13	16	18	4	1.6	730	2,224	489
1954	2,639	12	7	11	12	15	3	1.7	755	1,807	505
1955	2,790	12	7	11	12	14	3	1.6	695	1,733	457
1956	4,021	15	9	11	16	15	4	1.3	575	2,045	374
1957	5,808	22	13	17	23	24	5	1.3	587	3,060	387
1958	4,211	16	11	14	18	19	4	1.5	640	2,421	420
1959	2,885	12	7	11	12	15	3	1.7	696	1,803	460
1960	2,863	11	6	10	12	13	3	1.5	604	1,645	423
1961	2,265	10	6	9	10	12	3	1.6	707	1,450	470
1962	5,599	21	12	17	22	23	4	1.4	621	3,075	405
1963	1,576	7	5	8	7	11	2	2.2	854	1,241	579
1964	3,243	14	8	11	14	15	3	1.6	686	2,045	464
1965	5,211	22	14	19	22	28	5	1.7	721	3,412	481
1966	2,969	13	10	13	13	20	3	1.9	820	2,264	559
Total	106,639	444	274	370	472	514	105	-	-	64,883	-
Mean	4,102	17	11	14	18	20	4	1.5	677	2,495	448

Table 26

Dissolved constituent loads of San Rafael River near Green River, Utah

Units: 10 1/

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	13,910	135	122	144	80	326	13			26,810	1,420
1942	13,680	138	125	166	81	342	14			28,650	1,540
1943	7,260	95	92	129	46	260	11			21,300	2,150
1944	14,880	136	118	149	84	316	13			26,340	1,300
1945	8,529	103	95	131	52	267	11			21,400	1,840
1946	6,944	90	88	122	44	249	11			21,750	2,300
1947	11,050	145	125	197	65	382	16			28,690	1,910
1948	6,221	79	72	104	38	210	9	4.0	2,420	16,520	1,960
1949	13,470	144	133	152	79	337	14			27,420	1,500
1950	5,437	73	76	110	35	217	9			17,080	2,310
1951	7,452	93	92	136	46	265	10	4.2	2,490	20,740	2,040
1952	31,360	241	223	279	177	542	25	2.5	1,460	46,750	1,100
1953	8,059	105	110	151	52	300	13	4.1	2,600	23,460	2,140
1954	3,637	62	60	89	24	180	8	5.1	3,310	13,720	2,770
1955	2,890	46	45	64	19	131	6	4.7	3,050	10,060	2,560
1956	3,262	40	41	55	20	111	7	4.0	2,470	8,699	1,960
1957	18,940	187	139	192	98	405	17	2.7	1,680	33,110	1,290
1958	17,200	130	120	149	94	296	16	2.4	1,460	25,220	1,080
1959	2,023	36	77	54	14	109	5	5.4	3,550	8,181	2,970
1960	4,567	58	51	76	26	154	7	4.0	2,380	12,000	1,930
1961	4,815	98	54	82	25	206	8	3.6	2,790	15,680	2,400
1962	11,280	109	81	112	64	227	9	2.7	1,620	19,820	1,290
1963	4,593	79	65	89	28	198	7	4.2	2,920	16,260	2,600
1964	5,932	83	63	84	38	184	8	3.3	2,200	15,760	1,960
1965	18,330	167	147	177	106	369	14	2.6	1,610	32,780	1,310
1966	3,450	53	54	83	21	162	7	5.2	3,150	13,160	2,800
Total	249,171	2,725	2,468	3,276	1,456	6,745	288	-	-	551,360	-
Mean	9,584	105	95	126	56	259	11	-	-	21,210	1,630

1/ Except SAR, specific conductance, and p.p.m.

2/ Sodium adsorption ratio.

3/ Specific conductance.

Table 27

Dissolved constituent loads of Colorado River near Glenwood Springs, Colorado

Units: 1000 1/

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	1,711	5	2	3	4	3	3	1.1	430	588	250
1942	1,904	5	2	3	4	3	3	1.0	379	620	243
1943	1,826	5	2	3	4	3	3	1.1	405	607	243
1944	1,494	4	2	3	3	3	3	1.2	441	523	257
1945	1,763	4	2	3	4	3	3	1.1	387	553	228
1946	1,543	4	2	3	3	3	3	1.2	438	549	265
1947	2,297	5	2	4	5	3	3	1.0	350	648	206
1948	1,881	5	2	3	4	3	3	1.2	390	604	235
1949	2,036	6	2	3	5	3	3	1.0	394	652	235
1950	1,460	4	2	3	4	3	3	1.2	473	548	279
1951	1,891	5	2	3	4	3	3	1.0	398	619	243
1952	2,443	7	2	4	6	4	3	.9	390	791	235
1953	1,564	5	2	3	4	3	3	1.2	484	616	287
1954	855	3	1	3	3	2	3	1.9	678	470	404
1955	1,052	4	1	3	3	3	3	1.5	601	520	360
1956	1,457	5	2	3	4	3	3	1.1	491	591	301
1957	2,462	7	2	4	6	4	3	.9	383	797	235
1958	1,679	5	1	3	4	3	3	1.1	459	596	257
1959	1,340	4	1	3	3	3	3	1.4	513	567	309
1960	1,466	5	1	3	4	3	3	1.2	475	568	287
1961	1,208	4	1	3	3	3	3	1.5	543	530	323
1962	2,407	8	2	4	6	4	3	1.0	401	786	243
1963	922	4	1	3	3	3	3	1.9	659	492	390
1964	1,022	4	1	4	3	3	3	1.8	624	529	382
1965	1,763	6	2	4	5	3	3	1.2	470	670	279
1966	1,024	4	1	3	3	2	3	1.7	584	483	345
Total	42,470	127	43	84	104	79	78	-	-	15,517	-
Mean	1,633	5	2	3	4	3	3	1.2	448	597	272

Table 28

Dissolved constituent loads of Colorado River near Cameo, Colorado

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	3,073	11	5	13	9	9	11	2.0	*685	1,683	405
1942	3,489	13	5	14	11	9	13	2.0	*665	1,870	395
1943	2,946	10	4	12	9	8	10	1.9	*640	1,521	379
1944	2,680	10	4	11	9	7	9	2.0	679	1,415	387
1945	3,028	11	6	11	10	8	9	1.7	636	1,521	369
1946	2,554	9	4	11	8	7	10	2.1	686	1,384	399
1947	3,807	13	5	11	11	8	10	1.6	532	1,641	317
1948	3,225	11	5	12	10	9	10	1.8	612	1,604	365
1949	3,368	12	5	12	11	8	10	1.8	615	1,666	363
1950	2,515	10	5	11	9	8	10	2.2	736	1,481	434
1951	2,946	10	5	11	9	8	10	1.8	627	1,525	380
1952	4,134	16	7	13	15	10	11	1.5	605	2,051	366
1953	2,530	10	4	11	9	7	10	2.1	733	1,503	436
1954	1,565	8	3	11	6	7	9	3.1	1,010	1,303	614
1955	1,946	10	3	11	7	7	9	2.4	854	1,358	513
1956	2,392	10	4	10	8	7	9	2.0	715	1,399	431
1957	4,325	15	5	13	13	9	11	1.5	543	1,966	334
1958	2,822	11	4	12	9	8	10	1.9	670	1,543	405
1959	2,261	9	4	11	8	7	9	2.3	759	1,380	449
1960	2,414	10	4	11	8	7	9	2.2	715	1,408	429
1961	2,034	9	4	10	7	7	9	2.1	786	1,298	470
1962	3,986	14	5	12	12	9	10	1.5	574	1,830	338
1963	1,570	7	3	11	6	6	9	3.0	986	1,243	583
1964	1,934	8	3	11	6	6	10	2.6	830	1,310	499
1965	3,305	12	4	11	10	8	10	1.8	612	1,658	368
1966	1,800	8	3	11	6	6	9	2.8	873	1,272	522
Total	72,649	277	113	287	236	200	256	-	-	39,833	-
Mean	2,794	11	4	11	9	8	10	2.0	677	1,532	404

1/ Except SAR, specific conductance, and p.p.m.

2/ Sodium adsorption ratio.

3/ Specific conductance.

*Correlated

Table 29

Units: 1,000 1/ Dissolved constituent loads of Gunnison River near Grand Junction, Colorado

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	2,492	15	9	9	9	22	1	1.3	*820	2,072	610
1942	2,673	15	9	9	9	23	1	1.1	*760	2,057	566
1943	1,786	12	7	7	7	18	1	1.4	*870	1,577	647
1944	2,225	12	7	7	8	17	1	1.2	735	1,543	507
1945	1,819	11	7	7	7	17	1	1.4	845	1,499	603
1946	1,261	9	6	7	6	16	1	1.7	1,060	1,334	779
1947	1,937	12	7	8	7	18	1	1.4	845	1,604	610
1948	2,362	12	7	7	8	18	1	1.2	699	1,645	514
1949	2,120	12	7	7	8	17	1	1.3	779	1,601	559
1950	1,335	9	6	6	5	15	1	1.4	963	1,318	728
1951	1,136	9	5	6	5	14	1	1.5	1,020	1,165	757
1952	2,674	14	8	7	10	18	1	1.0	685	1,782	492
1953	1,312	10	6	6	5	15	1	1.5	1,000	1,340	750
1954	645	7	4	5	3	12	1	2.1	1,500	1,060	1,210
1955	1,016	8	4	5	4	13	1	1.5	1,070	1,150	831
1956	1,100	8	4	5	4	12	1	1.3	935	1,084	728
1957	3,380	17	8	8	12	19	2	.9	625	2,062	448
1958	2,261	12	6	7	8	16	1	1.0	699	1,612	522
1959	981	8	5	5	5	14	1	1.7	1,160	1,191	882
1960	1,332	9	5	5	5	13	1	1.2	872	1,167	647
1961	1,105	9	5	5	5	14	1	1.4	1,030	1,169	779
1962	2,137	11	5	5	7	15	0	.9	680	1,413	485
1963	892	8	4	5	4	13	0	1.7	1,230	1,176	970
1964	1,355	10	5	5	5	13	1	1.1	908	1,298	706
1965	2,673	14	6	6	8	17	1	1.0	657	1,742	478
1966	971	9	5	5	4	14	0	1.7	1,180	1,239	941
Total	44,980	282	157	164	168	413	24	-	-	37,900	-
Mean	1,730	11	6	6	6	16	1	1.3	835	1,458	619

Table 30

Units: 1,000 1/ Dissolved constituent loads of Colorado River near Cisco, Utah

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	7,066	35	22	34	24	51	15	1.8	*900	5,652	588
1942	7,099	34	22	33	24	49	15	1.8	*870	5,486	566
1943	5,214	28	18	27	19	41	13	1.9	*960	4,498	632
1944	5,840	30	16	26	22	37	14	1.7	848	4,336	544
1945	5,505	28	16	25	21	36	14	1.8	867	4,210	559
1946	4,058	24	15	22	16	34	11	2.0	1,010	3,680	669
1947	6,259	32	17	27	22	39	14	1.7	821	4,588	537
1948	6,291	33	18	27	24	38	15	1.6	826	4,638	544
1949	6,337	32	18	29	24	39	16	1.8	859	4,780	551
1950	4,074	24	15	24	16	33	14	2.1	1,040	3,823	691
1951	3,987	23	14	23	14	32	13	2.1	1,010	3,758	691
1952	7,719	34	19	27	26	39	15	1.4	724	5,064	485
1953	4,061	24	15	25	15	34	15	2.2	1,060	3,943	713
1954	2,293	19	13	22	10	30	13	3.1	1,570	3,300	1,060
1955	3,186	21	13	22	12	30	14	2.4	1,180	3,421	786
1956	3,568	22	13	21	13	30	13	2.1	1,060	3,428	706
1957	8,889	42	18	31	29	44	19	1.4	721	5,602	463
1958	6,044	29	15	26	19	36	16	1.6	814	4,348	529
1959	3,215	22	13	22	12	31	13	2.4	1,200	3,481	794
1960	4,004	23	13	21	14	31	13	1.9	964	3,496	639
1961	3,395	24	12	22	12	32	13	2.2	1,150	3,555	772
1962	6,575	33	14	26	22	35	15	1.6	764	4,483	500
1963	2,585	21	11	21	10	30	13	2.8	1,390	3,384	963
1964	3,433	22	13	21	13	28	14	2.2	1,110	3,639	779
1965	6,722	32	17	28	22	37	17	1.7	807	4,892	535
1966	3,163	20	13	22	12	30	13	2.4	1,170	3,471	808
Total	130,582	711	416	654	467	926	370	-	-	108,956	-
Mean	5,022	27	16	25	18	36	14	1.9	926	4,191	610

*Correlated

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.

Table 31

Dissolved constituent loads of San Juan River near Archuleta, New Mexico

Units: 10 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	257,400	434	127	160	492	222	22		*200	42,450	125
1942	136,600	251	82	104	287	147	15		*220	27,360	140
1943	81,820	166	55	77	187	106	11		*240	18,330	154
1944	125,100	208	66	88	247	115	14		*210	23,210	132
1945	89,250	164	54	74	190	99	12		*240	18,690	154
1946	45,640	102	36	64	115	81	8	1.0	314	12,640	206
1947	75,980	144	47	76	172	93	9	.8	246	16,650	162
1948	120,300	203	66	85	233	108	14	.6	205	22,030	132
1949	142,000	255	85	95	279	140	21	.6	219	27,450	140
1950	56,420	119	42	59	128	87	8	.7	276	13,820	176
1951	41,270	95	31	56	106	73	7	.9	318	11,650	206
1952	155,200	290	97	100	311	170	16	.5	224	32,160	154
1953	56,310	124	42	66	136	91	9	.8	293	14,930	191
1954	54,540	127	35	61	135	84	9	.8	300	14,960	206
1955	53,690	115	36	56	134	69	11	.7	268	13,180	176
1956	53,890	104	35	48	120	64	10	.7	247	12,320	162
1957	164,700	322	93	132	372	172	23	.6	223	33,030	147
1958	133,200	279	95	101	312	149	14	.5	254	31,320	176
1959	43,630	107	27	54	110	67	9	.8	307	11,860	198
1960	102,900	203	48	88	213	121	14	.6	242	23,070	169
1961	74,990	155	41	71	164	96	10	.7	260	17,610	176
1962	87,200	155	48	64	170	92	9	.6	224	17,780	154
1963	23,190	53	13	26	53	35	4	.8	293	6,184	206
1964	43,660	102	27	50	103	64	7	.8	301	11,650	198
1965	151,100	288	80	126	313	173	18	.6	244	32,360	154
1966	96,100	202	59	87	194	128	15	.7	269	22,950	176
Total	2,466,080	4,767	1,467	2,068	5,276	2,846	319	-	-	529,644	-
Mean	94,850	183	56	80	203	109	12	-	240	20,370	158

Table 32

Dissolved constituent loads of San Juan River near Bluff, Utah

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	4,898	23	8	12	18	23	2	1.1	608	2,624	397
1942	2,247	10	5	5	8	11	1	1.0	582	1,185	390
1943	1,493	8	4	5	6	9	1	1.3	699	959	470
1944	2,291	10	4	5	8	10	1	.9	537	1,101	353
1945	1,589	8	4	5	6	9	1	1.2	647	936	434
1946	887	6	3	4	4	7	1	1.5	818	681	566
1947	1,677	9	4	6	6	11	1	1.5	694	1,087	478
1948	2,141	9	3	5	7	9	1	1.0	498	977	338
1949	2,487	11	4	5	8	11	1	1.0	516	1,169	345
1950	854	5	3	3	3	6	1	1.3	724	579	500
1951	691	4	2	3	3	6	1	1.6	812	544	581
1952	2,554	10	4	5	8	10	1	.9	488	1,156	331
1953	968	6	3	4	4	7	1	1.5	754	702	537
1954	1,011	6	3	4	4	8	1	1.6	803	779	566
1955	911	5	2	4	4	7	1	1.6	769	668	537
1956	840	4	2	3	3	5	1	1.3	673	537	470
1957	2,908	13	5	7	9	13	2	1.2	555	1,498	375
1958	2,297	9	4	5	7	10	1	1.0	527	1,116	360
1959	711	5	2	4	3	6	1	1.8	853	577	595
1960	1,608	7	3	5	5	8	1	1.2	563	848	390
1961	1,264	7	3	5	5	8	1	1.4	702	836	485
1962	1,479	7	2	5	4	8	1	1.4	637	876	434
1963	579	4	2	3	2	7	1	2.1	1,110	635	808
1964	796	5	2	4	3	8	1	2.1	979	782	720
1965	2,546	10	5	6	8	13	1	1.2	589	1,379	398
1966	1,550	7	4	5	5	10	1	1.4	683	999	470
Total	43,278	208	90	127	156	240	28	-	-	25,230	-
Mean	1,665	8	3	5	6	9	1	1.2	629	970	426

*Correlated

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.

Table 33

Dissolved constituent loads of Colorado River at Lees Ferry, Arizona

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	17,856	91	48	60	68	115	24		*770	12,481	514
1942	14,793	62	39	46	51	84	19		*700	9,381	463
1943	11,414	52	33	49	39	74	21	1.8	808	8,375	537
1944	13,019	54	33	50	42	74	22	1.7	732	8,525	485
1945	11,768	57	33	48	44	71	22		*800	8,501	529
1946	8,751	52	29	39	39	64	20		*910	7,346	617
1947	14,046	72	38	48	55	82	20		*760	9,513	500
1948	12,885	61	32	48	48	71	21	1.5	748	8,531	485
1949	14,604	71	38	54	58	82	24	1.5	769	9,954	500
1950	10,801	55	33	45	44	70	20	1.7	844	8,098	551
1951	9,900	54	30	43	41	67	20	1.7	882	7,833	581
1952	17,904	82	43	61	70	92	24	1.4	710	11,396	470
1953	8,730	49	29	44	36	66	20	1.9	943	7,487	632
1954	6,164	42	22	39	29	57	18	2.3	1,130	6,385	764
1955	6,966	45	24	38	33	56	18	2.0	1,020	6,548	691
1956	8,659	48	24	36	37	52	18	1.6	840	6,514	551
1957	18,702	101	41	58	82	92	25	1.3	766	12,646	500
1958	13,141	71	30	47	58	70	22	1.4	782	9,280	522
1959	7,061	44	22	39	30	55	18	2.0	1,010	6,766	706
1960	8,790	51	20	38	36	54	17	1.7	851	7,092	595
1961	7,316	51	21	38	31	59	18	1.9	1,030	7,069	713
1962	14,439	76	31	52	61	76	22	1.5	763	10,319	522
1963	1,384	10	6	11	6	15	6	3.0	1,350	1,758	933
1964	3,244	23	11	21	13	31	11	2.4	1,200	3,578	808
1965	11,585	61	29	51	41	78	23	1.9	865	9,008	572
1966	7,739	37	20	32	26	49	13	1.9	802	5,439	515
Total	281,661	1,472	759	1,135	1,118	1,756	506	--	--	209,823	--
Mean	10,833	57	29	44	43	68	19	--	823	8,070	548

Table 34

Dissolved constituent loads of the Colorado River near Grand Canyon, Arizona

Units: 1,000 1/

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
		Ionic loads in tons equivalent									
1941	18,796	103	47	85	81	120	36	1.8	869	14,503	566
1942	14,925	*64	*40	*59	*51	*82	*31	*1.7	*769	10,186	500
1943	11,624	*72	*35	*59	*57	*79	*31	*2.1	*961	10,033	632
1944	13,330	69	35	59	61	75	29	1.7	859	9,948	551
1945	12,115	71	35	59	61	75	31	1.8	941	10,097	610
1946	9,119	58	30	54	49	67	29	2.2	1,070	8,742	706
1947	14,347	80	39	65	68	86	32	1.8	885	11,295	581
1948	13,009	71	34	56	61	71	30	1.7	858	9,799	551
1949	14,622	83	39	64	72	83	31	1.7	871	11,254	566
1950	10,836	65	34	53	57	70	29	1.8	987	9,462	640
1951	9,934	60	32	53	49	69	29	2.0	994	9,133	676
1952	18,106	102	49	71	94	93	34	1.5	835	13,582	551
1953	8,804	58	31	53	48	66	29	2.2	1,110	8,693	728
1954	6,300	45	23	48	32	58	26	2.7	1,270	7,175	838
1955	7,287	48	25	48	36	57	27	2.4	1,150	7,494	757
1956	8,773	49	25	44	39	52	26	1.9	919	7,174	603
1957	18,910	103	40	71	78	101	35	1.5	788	13,263	515
1958	13,461	*72	*33	*57	*60	*74	*30	*1.7	*830	9,854	537
1959	7,308	*49	*22	*48	*35	*58	*27	*2.4	*1,140	7,648	772
1960	9,154	52	22	48	38	*58	*27	2.1	935	7,833	632
1961	7,739	55	24	50	36	*66	*28	2.4	1,150	8,252	787
1962	14,839	78	33	60	65	*75	*32	1.7	806	10,817	537
1963	1,630	12	7	18	9	*15	*12	4.0	1,590	2,291	1,040
1964	3,582	26	12	31	16	*32	*21	3.2	1,370	4,450	912
1965	11,773	62	30	60	45	78	30	2.2	939	10,185	618
1966	8,277	41	20	42	30	50	22	2.3	910	6,333	576
Total	288,600	1,648	796	1,415	1,328	1,810	744	-	-	239,496	-
Mean	11,100	*63	*31	*54	*51	*70	*29	*2.0	929	9,211	610

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.
*Estimated or partially estimated.

Table 35

Units: 1,000 1/ Dissolved constituent loads of the Virgin River at Littlefield, Arizona

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	427	5*	2*	3*	2*	5*	2*	1.9*	1,600*	583*	1,010*
1942	186	3*	1*	2*	1*	3*	2*	2.7*	2,120*	375*	1,480*
1943	179	3*	1*	2*	1*	3*	2*	2.7*	2,230*	385*	1,580*
1944	181	3*	1*	2*	1*	3*	2*	2.7*	2,040*	347*	1,410*
1945	181	3*	1*	2*	1*	4*	2*	2.7*	2,470*	441*	1,790*
1946	169	3*	1*	2*	1*	4*	2*	2.9*	2,460*	409*	1,780*
1947	131	2*	1*	2*	1*	3*	2*	2.5*	2,570*	336*	1,880*
1948	111	2*	1*	2*	1*	3*	1*	3.1*	2,650*	294*	1,950*
1949	163	3*	1*	2*	1*	3*	2*	2.7*	2,260*	354*	1,600*
1950	118	2	1	2	1	3	1	3.1	2,690	313	1,950
1951	112	2	1	2	1	3	2	3.2	2,930	328	2,150
1952	267	3	2	2	2	4	2	2.5	1,770	390	1,070
1953	98	2	1	2	1	3	1	3.2	3,030	292	2,210
1954	140	3	1	2	1	3	2	2.8	2,620	365	1,920
1955	133	3	1	2	1	4	2	2.8	3,000	421	2,320
1956	82	2	1	1	1	2	1	3.3	3,020	249	2,240
1957	133	3	1	2	1	3	2	3.1	2,670	347	1,920
1958	272	4	2	2	1	4	2	2.1	1,690	457	1,240
1959	91	2	1	1	1	2	1	3.2	2,900	260	2,110
1960	84	2	1	1	1	2	1	3.3	2,830	236	2,050
1961	108	3*	1*	2	1	3	1	3.0	3,030	338	2,310
1962	137	2*	1*	2	1	3	1	2.8	2,180	293	1,570
1963	85	2*	1*	1	1	2	1	3.3	2,970	266	2,310
1964	87	2*	1*	1	1	2	1	3.3	2,790	261	2,210
1965	151	3*	1*	2	1	3	1	3.2	2,110	328	1,500
1966	158	3*	1*	2	1	3	1	2.8	2,600	374	1,740
Total	3,984	70*	29*	48*	28	80*	40*	-	-	9,042*	-
Mean	153	3*	1*	2*	1*	3*	1*	3.1*	2,340	348*	1,670*

Table 36

Units: 1,000 1/ Dissolved constituent loads of the Colorado River below Hoover Dam, Arizona-Ne

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR 2/	Kx10[6] at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	14,889	107	44	83	50	143	43	2.1	1,110	14,897	735
1942	15,762	109	48	88	56	146	43	2.1	1,070	15,381	721
1943	12,715	80	37	67	44	108	31	2.1	1,010	11,502	662
1944	14,427	90*	44*	77*	52*	122*	39*	2.1	1,040	13,607	691
1945	12,512	76*	36*	64*	45*	98*	34*	2.1	1,020	11,512	676
1946	10,585	63*	32*	54*	38*	83*	29*	2.1	1,010	9,626	669
1947	10,959	66*	33*	59*	40*	87*	31*	2.2	1,020	10,283	691
1948	13,051	80*	38*	67*	47*	104*	34*	2.1	989	11,713	662
1949	13,566	79*	39*	69*	48*	104*	35*	2.1	947	11,250	610
1950	12,016	70*	35*	59*	43*	89*	32*	2.0	963	10,046	618
1951	9,870	56	31*	53*	37*	76*	28*	2.2	978	9,005	669
1952	15,816	86	45	79	55*	116*	40*	2.1	938	13,401	625
1953	11,302	66	31	58	41*	85*	29*	2.1	974	10,093	654
1954	10,514	65	30	58	39*	85*	29*	2.2	1,030	9,913	691
1955	8,589	61	27	56	33*	81*	31*	2.5	1,190	9,393	801
1956	7,812	54	29	54	30	76*	31*	2.6	1,230	8,918	838
1957	9,323	61*	30*	58*	35*	82*	33*	2.4	1,140	9,681	765
1958	11,877	68	31	58	41	87*	30*	2.0	948	10,243	632
1959	9,282	52	25	44	33	67*	23*	2.0	944	7,841	618
1960	8,997	55	25	48	32	70*	26*	2.2	1,000	8,209	669
1961	8,586	54*	27*	48*	31*	71*	28*	2.2	1,040	8,139	699
1962	8,615	55*	25*	48*	31*	71*	26*	2.2	1,100	8,033	684
1963	8,533	52*	24*	45*	31*	66*	25*	2.1	1,020	7,882	676
1964	8,163	51*	25*	48	28	69	29	2.4	1,070	8,014	721
1965	7,792	54	26	54	28	71	32	2.6	1,220	8,574	818
1966	7,777	49	26	52	27	69	30	2.7	1,150	7,857	743
Total	283,330	1,759*	843*	1,548*	1,015*	2,326*	821*	-	-	265,013	-
Mean	10,897	68*	32*	60*	39*	89*	32*	2.2	1,040	10,193	687

1/ Except SAR, specific conductance, and p.p.m.
2/ Sodium adsorption ratio.
3/ Specific conductance.
* Estimated or partially estimated.

Table 37

Units:1,000 1/ Dissolved constituent loads of the Colorado River below Parker Dam, Ariz.-Colo.

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	14,749	105*	46*	89*	52*	143*	46*	2.3	1,150*	15,052	750
1942	15,195	103*	46*	85*	53*	138*	44*	2.1	1,110*	14,662	706
1943	12,079	74*	36*	66*	40*	101*	34*	2.2	1,030	10,858	662
1944	13,842	83*	44*	75*	47*	116*	39*	2.2	1,050*	12,596	669
1945	12,033	71*	38*	67*	42*	97*	35*	2.2	1,040	10,808	662
1946	10,141	58*	32*	57*	35*	83*	30*	2.3	1,040*	9,075	654
1947	10,663	62*	33*	61*	35*	88*	32*	2.3	1,050*	9,725	669
1948	12,651	73*	38*	69*	41*	101*	36*	2.2	1,020*	11,144	647
1949	13,060	72	36	66	42	95	34	2.1	947	10,716	603
1950	10,473	58*	30*	54*	35*	79*	28*	2.2	976	8,801	618
1951	8,672	43*	27	48	29	67	25	2.3	1,020	7,612	647
1952	15,413	82*	46*	78*	51*	114*	41*	2.1	962*	12,838	610
1953	10,649	57*	31*	54*	36*	80*	28*	2.1	958*	8,944	618
1954	9,671	54*	31*	53*	33*	77*	28*	2.3	1,010*	8,584	654
1955	8,141	51*	29*	53*	27*	76*	29*	2.5	1,160*	8,255	743
1956	6,869	45*	26*	48*	23*	70*	28*	2.6	1,260*	7,532	809
1957	7,997	51*	28*	52*	26*	75*	31*	2.5	1,190*	8,288	765
1958	10,892	62*	32*	55*	35*	84*	31*	2.1	996	9,412	632
1959	8,186	45*	23*	40*	25*	61*	22*	2.0	961*	6,786	610
1960	7,794	43	23	40	23	60	23	2.2	1,000	6,696	632
1961	6,975	40*	22*	39*	22*	57*	23*	2.3	1,060	6,350	669
1962	7,159	42*	23*	42*	22*	61*	25*	2.4	1,100*	6,810	699*
1963	7,251	42	23	41	23	60	24	2.3	1,070	6,718	684
1964	6,638	38*	21*	38*	21*	55*	23*	2.3	1,080*	6,121	676
1965	6,356	40	23	41	20	60	27	2.5	1,220	6,615	767
1966	6,683	41	24	44	21	62	27	2.5	1,180	6,863	756
Total	260,232	1,540*	811*	1,455*	859*	2,160*	793*	-	-	237,861*	-
Mean	10,009	59*	31*	56*	33*	83*	30*	2.3	1,050*	9,148*	672*

Table 38

Units:1,000 1/ Dissolved constituent loads of Colorado River at Imperial Dam, Ariz.-Calif.

Calendar year	Mean discharge (a.f.)	Ionic loads in tons equivalent: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	SAR2/	$Kx10^6$ at 25° C. 3/	T.D.S. Tons	T.D.S. p.p.m.
1941	14,024	95	42	89	48	130	49	2.4	1,140	14,980	787
1942	14,714	102	45	91	51	139	46	2.4	1,140	15,917	794
1943	11,345	73	34	64	40	98	31	2.2	1,040	10,679	691
1944	13,205	82	42	77	49	114	39	2.3	1,070	12,545	699
1945	11,390	69	38	66	41	98	36	2.3	1,070	10,841	699
1946	9,486	56	31	56	34	80	31	2.4	1,060	9,041	699
1947	10,041	62	34	60	37	86	34	2.4	1,080	9,711	713
1948	12,036	73	38	69	45	100	36	2.1	1,060	11,242	684
1949	12,567	73	38	64	46	96	35	2.1	986	11,104	647
1950	9,906	57	30	54	37	76	30	2.2	1,010	8,887	662
1951	8,053	47	26	49	31	65	27	2.5	1,060	7,764	706
1952	14,815	82	46	83	54	113	44	2.3	1,010	13,485	669
1953	10,045	57	32	57	38	79	31	2.3	1,030	9,411	691
1954	9,030	53	29	56	35	74	31	2.5	1,070	9,024	735
1955	7,708	51	29	56	29	75	32	2.7	1,230	8,797	838
1956	6,266	45	24	51	24	67	31	3.0	1,350	7,828	919
1957	7,344	53	27	56	28	73	34	2.8	1,310	8,598	860
1958	10,500	65	30	69	39	87*	37*	2.6	1,100	10,626	743
1959	7,695	47	22	49	28	63*	28*	2.6	1,100	7,843	750
1960	7,107	46	20	48	26	60*	29*	2.7	1,160	7,511	779
1961	6,293	42	19	47	23	57*	29*	2.9	1,220	7,020	824
1962	6,458	43	21	51	24	61	31	3.0	1,270	7,189	816
1963	6,522	44	19	49	24	59	29	2.9	1,220	7,016	794
1964	5,900	38	19	47	22	55	28	3.1	1,270	6,616	824
1965	5,703	40	20	50	21	59	31	3.2	1,390	7,109	917
1966	5,849	40	21	53	22	60	32	3.4	1,380	7,133	895
Total	244,002	1,535	776	1,561	896	2,124*	871*	-	-	247,917	
Mean	9,385	59	30	60	34	82*	34*	2.5	1,120	9,535	747

1/ Except SAR, specific conductance, and p.p.m.

2/ Sodium adsorption ratio.

3/ Specific conductance.

*Estimated or partially estimated.

Table 39

Colorado River Basin

Historical Flow and Sedimentation Data

Green River near Jensen, Utah

Month	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)	Month	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)
		Year 1949			Year 1955				Year 1961				
Jan.	53	100	7	37	70	4	Jan.	46	60	4			
Feb.	56	150	12	40	80	4	Feb.	48	50	3			
March	159	2,180	470	102	1,290	180	March	115	1,450	227			
April	406	2,950	1,628	271	3,510	1,296	April	161	1,120	245			
May	940	2,140	2,744	562	1,350	1,035	May	354	1,420	685			
June	1,079	2,380	3,494	540	520	379	June	472	1,160	744			
July	372	980	493	178	1,170	284	July	94	90	12			
Aug.	111	360	54	112	4,430	673	Aug.	62	2,750	232			
Sept.	64	130	11	50	300	21	Sept.	94	2,340	299			
Oct.	119	1,670	269	51	100	7	Oct.	148	990	199			
Nov.	106	230	33	55	260	19	Nov.	103	270	38			
Dec.	64	120	11	76	1,160	121	Dec.	71	190	18			
Total	3,529	1,920	9,226	2,074	1,430	4,023	Total	1,768	1,120	2,706			
		Year 1950			Year 1956				Year 1962				
Jan.	77	160	16	80	230	25	Jan.	63	40	3			
Feb.	72	350	34	50	110	7	Feb.	260	13,360	4,723			
March	208	2,640	747	272	9,290	3,437	March	273	16,820	6,246			
April	531	5,020	3,624	454	1,680	1,039	April	914	6,170	7,667			
May	843	2,460	2,822	918	1,960	2,452	May	1,050	1,750	2,495			
June	1,202	1,500	2,447	992	1,170	1,581	June	820	1,270	1,418			
July	577	880	688	252	240	81	July	451	780	481			
Aug.	193	260	69	142	750	145	Aug.	144	180	35			
Sept.	106	920	132	61	90	8	Sept.	58	130	10			
Oct.	101	120	17	60	290	24	Oct.	68	60	6			
Nov.	107	180	26	62	260	22	Nov.	35	20	1			
Dec.	90	100	12	47	80	5	Dec.	32	50	2			
Total	4,107	1,900	10,634	3,390	1,910	8,826	Total	4,168	4,070	23,088			
		Year 1951			Year 1957				Year 1963				
Jan.	70	110	11	46	60	3	Jan.	46	100	6			
Feb.	95	360	46	65	580	51	Feb.	63	200	17			
March	147	2,500	500	141	1,520	292	March	58	1,060	84			
April	344	2,030	948	264	1,510	544	April	121	630	104			
May	788	1,930	2,070	854	2,150	2,502	May	339	1,480	682			
June	1,033	1,170	1,643	1,573	1,380	2,950	June	204	530	147			
July	502	480	325	906	770	955	July	31	50	2			
Aug.	275	1,190	446	236	770	246	Aug.	28	5,170	197			
Sept.	120	250	42	122	320	54	Sept.	30	2,080	85			
Oct.	138	2,470	465	122	130	22	Oct.	21	140	4			
Nov.	83	300	34	102	120	16	Nov.	38	830	43			
Dec.	74	60	6	75	140	13	Dec.	64	460	40			
Total	3,669	1,310	6,536	4,506	1,250	7,648	Total	1,043	990	1,411			
		Year 1952			Year 1958				Year 1964				
Jan.	71	80	7	68	30	3	Jan.	74	470	47			
Feb.	74	130	13	102	520	72	Feb.	76	370	38			
March	91	350	44	153	940	196	March	63	310	27			
April	773	6,780	7,142	356	1,930	935	April	147	3,190	638			
May	1,421	2,370	4,582	1,103	1,690	2,528	May	538	2,470	1,811			
June	1,199	1,290	2,106	805	800	881	June	486	810	537			
July	326	670	300	142	180	35	July	255	500	172			
Aug.	178	900	218	75	110	11	Aug.	147	750	150			
Sept.	93	200	26	54	200	15	Sept.	142	240	46			
Oct.	69	30	3	58	60	5	Oct.	168	220	51			
Nov.	58	60	4	60	70	6	Nov.	158	210	46			
Dec.	55	40	3	62	70	6	Dec.	214	350	133			
Total	4,408	2,410	14,448	3,038	1,140	4,693	Total	2,468	1,100	3,696			
		Year 1953			Year 1959				Year 1965				
Jan.	73	90	9	47	60	4	Jan.	259	710	250			
Feb.	73	70	7	55	40	3	Feb.	247	760	280			
March	126	1,040	179	105	910	130	March	272	700	260			
April	198	1,170	314	199	1,370	371	April	413	4,360	2,448			
May	421	1,690	970	438	400	238	May	598	1,890	1,539			
June	936	1,620	2,070	696	590	555	June	695	1,580	1,494			
July	281	340	131	260	990	351	July	237	2,220	716			
Aug.	143	640	125	127	1,110	192	Aug.	104	1,140	162			
Sept.	59	30	3	87	7,860	930	Sept.	109	2,430	360			
Oct.	53	30	2	123	4,210	705	Oct.	150	510	104			
Nov.	67	60	5	102	2,790	387	Nov.	161	370	82			
Dec.	56	60	5	56	110	8	Dec.	159	360	77			
Total	2,486	1,130	3,820	2,295	1,240	3,875	Total	3,404	1,680	7,772			
		Year 1954			Year 1960				Year 1966				
Jan.	52	50	4	50	60	4	Jan.	112	420	64			
Feb.	73	180	18	52	70	5	Feb.	104	440	62			
March	115	530	84	272	8,050	2,978	March	246	4,230	1,415			
April	255	1,170	407	468	2,070	1,320	April	322	1,430	627			
May	572	1,600	1,249	492	1,330	891	May	418	1,080	612			
June	332	1,080	488	554	1,030	778	June	257	580	202			
July	307	840	350	129	150	26	July	131	210	38			
Aug.	101	180	25	57	3,410	264	Aug.	134	1,830	333			
Sept.	72	1,200	117	38	160	8	Sept.	133	370	67			
Oct.	77	580	61	64	560	49	Oct.	155	1,850	391			
Nov.	72	100	9	77	120	13	Nov.	114	280	43			
Dec.	33	120	5	46	80	5	Dec.	135	190	34			
Total	2,061	1,000	2,817	2,299	2,030	6,341	Total	2,261	1,260	3,888			

Table 40

Colorado River Basin

Historical Flow and Sedimentation Data

Green River at Green River, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1941			Year 1947		
Jan.	100	420	57	92	670	84
Feb.	126	3,400	583	151	1,310	268
March	216	5,300	1,560	411	11,040	6,181
April	314	3,960	1,690	422	3,060	1,760
May	1,172	8,080	12,890	1,400	4,480	8,542
June	1,146	4,030	6,286	1,348	2,870	5,269
July	359	1,310	641	656	1,560	1,389
Aug.	267	12,130	4,416	365	6,910	3,439
Sept.	182	5,400	1,336	166	880	199
Oct.	318	6,900	2,986	181	1,870	461
Nov.	240	1,740	569	179	540	132
Dec.	168	430	99	152	360	74
Total	4,608	5,280	33,113	5,523	3,700	27,798
	Year 1942			Year 1948		
Jan.	112	590	91	141	230	44
Feb.	122	230	38	137	640	119
March	264	3,790	1,363	313	4,670	1,994
April	858	10,420	12,170	558	5,910	4,486
May	980	5,280	7,040	1,061	3,760	5,433
June	1,271	3,250	5,618	952	2,250	2,912
July	414	1,410	795	268	1,060	386
Aug.	152	580	120	137	3,590	671
Sept.	91	570	71	69	160	15
Oct.	118	1,280	205	92	1,100	139
Nov.	124	260	44	104	140	19
Dec.	116	230	36	97	190	25
Total	4,622	4,390	27,591	3,929	3,040	16,243
	Year 1943			Year 1949		
Jan.	112	150	23	100	300	41
Feb.	130	410	72	110	270	41
March	236	1,670	536	276	3,030	1,140
April	569	4,140	3,208	474	3,560	2,296
May	763	2,520	2,618	1,221	4,130	6,861
June	1,074	2,920	4,276	1,547	4,000	8,430
July	612	1,360	1,132	592	3,910	3,154
Aug.	300	8,070	3,298	172	1,030	242
Sept.	116	1,470	232	112	1,200	182
Oct.	124	2,600	439	207	3,960	1,115
Nov.	146	920	183	190	430	110
Dec.	112	240	37	128	160	28
Total	4,294	2,750	16,054	5,129	3,390	23,640
	Year 1944			Year 1950		
Jan.	80	300	32	141	270	51
Feb.	111	290	44	147	260	53
March	252	3,600	1,237	356	2,560	1,241
April	529	9,810	7,060	620	5,010	4,227
May	924	6,040	7,604	1,026	3,320	4,632
June	1,391	2,840	5,373	1,567	2,460	5,250
July	591	1,410	1,134	734	2,370	2,372
Aug.	143	390	75	246	300	100
Sept.	73	140	14	149	730	148
Oct.	115	570	89	153	220	46
Nov.	119	170	28	166	150	33
Dec.	88	90	11	171	140	33
Total	4,416	3,780	22,701	5,476	2,440	18,186
	Year 1945			Year 1951		
Jan.	109	100	15	113	100	15
Feb.	128	260	45	167	230	52
March	185	1,220	309	205	770	214
April	291	3,590	1,420	372	2,180	1,102
May	909	3,380	4,182	882	2,710	3,258
June	1,016	2,390	3,304	1,309	2,330	4,155
July	701	1,740	1,660	627	1,430	1,222
Aug.	335	4,750	2,169	379	7,800	4,019
Sept.	163	1,350	299	178	1,850	447
Oct.	161	800	175	211	3,880	1,111
Nov.	149	250	51	164	540	120
Dec.	113	210	32	132	270	48
Total	4,260	2,360	13,661	4,739	2,450	15,763
	Year 1946			Year 1952		
Jan.	123	180	30	134	240	43
Feb.	117	340	54	140	260	50
March	236	1,200	385	160	430	94
April	528	3,460	2,491	988	8,450	11,360
May	775	2,190	2,308	2,087	4,280	12,160
June	746	1,860	1,888	1,809	1,780	4,392
July	264	540	193	514	960	673
Aug.	152	6,540	1,354	315	4,100	1,758
Sept.	105	3,090	440	184	2,230	559
Oct.	149	3,820	774	129	70	13
Nov.	170	1,800	418	122	90	15
Dec.	154	640	135	129	130	23
Total	3,519	2,190	10,470	6,711	3,410	31,140

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1953			Year 1959		
Jan.	140	100	19	97	90	12
Feb.	141	120	24	114	140	21
March	217	880	259	146	330	66
April	221	670	201	219	1,120	334
May	454	1,760	1,090	480	1,010	661
June	1,167	2,920	4,646	763	1,390	1,446
July	376	770	395	346	1,300	612
Aug.	212	3,950	1,137	180	8,950	2,192
Sept.	87	270	32	104	2,200	311
Oct.	86	340	40	178	4,010	972
Nov.	125	230	39	152	690	143
Dec.	107	260	37	106	190	28
Total	3,333	1,750	7,919	2,885	1,730	6,798
	Year 1954			Year 1960		
Jan.	107	220	32	95	270	35
Feb.	138	470	88	102	170	23
March	169	710	164	320	6,470	2,815
April	270	1,610	591	534	2,880	2,091
May	640	2,450	2,130	551	1,420	1,067
June	376	780	401	682	1,320	1,228
July	346	2,220	1,034	170	250	58
Aug.	120	1,940	316	69	920	86
Sept.	134	13,750	2,509	59	1,810	145
Oct.	139	8,960	1,690	96	3,260	425
Nov.	120	490	80	105	240	35
Dec.	80	280	31	80	230	25
Total	2,639	2,530	9,066	2,863	2,060	8,033
	Year 1955			Year 1961		
Jan.	80	520	57	79	150	16
Feb.	86	310	36	94	150	19
March	237	5,980	1,933	136	600	111
April	311	3,720	1,574	184	1,090	274
May	677	3,320	3,060	342	1,370	639
June	654	1,740	1,552	542	1,160	856
July	223	590	180	112	540	83
Aug.	161	5,550	1,215	80	6,210	676
Sept.	71	2,020	194	175	18,500	4,403
Oct.	77	220	23	234	5,380	1,713
Nov.	86	230	27	161	840	183
Dec.	127	410	71	126	520	90
Total	2,790	2,610	9,922	2,265	2,940	9,063
	Year 1956			Year 1962		
Jan.	155	610	128	114	980	152
Feb.	100	310	42	403	7,420	4,066
March	314	7,220	3,087	401	10,720	5,848
April	460	3,110	1,946	1,093	8,470	12,587
May	995	3,820	5,175	1,350	3,960	7,277
June	1,207	2,720	4,463	1,074	1,920	2,801
July	294	700	281	598	1,230	1,003
Aug.	169	2,480	570	176	240	58
Sept.	72	120	12	98	12,690	1,691
Oct.	77	670	70	126	4,450	763
Nov.	99	430	58	94	180	23
Dec.	79	170	18	72	130	13
Total	4,021	2,900	15,850	5,599	4,760	36,282
	Year 1957			Year 1963		
Jan.	83	130	14	71	270	26
Feb.	100	250	34	120	1,550	253
March	237	1,630	526	99	470	63
April	290	1,700	672	154	960	200
May	913	3,880	4,817	399	1,710	930
June	1,871	3,030	7,722	310	720	302
July	1,164	2,330	3,698	51	130	9
Aug.	386	8,300	4,364	72	14,110	1,382
Sept.	202	5,870	1,613	95	13,630	1,761
Oct.	185	1,180	297	47	3,070	196
Nov.	228	2,890	896	74	860	87
Dec.	149	490	100	84	3,270	374
Total	5,808	3,130	24,753	1,576	2,600	5,583
	Year 1958			Year 1964		
Jan.	128	240	42	109	1,170	173
Feb.	183	1,320	331	114	2,650	411
March	246	1,580	529	128	1,290	225
April	432	3,660	2,151	190	3,910	1,010
May	1,311	4,570	8,151	634	6,370	5,491
June	1,174	2,440	3,989	725	2,190	2,160
July	224	300	90	344	990	464
Aug.	110	470	70	196	7,430	1,981
Sept.	96	1,660	217	140	1,820	346
Oct.	91	130	16	196	370	98
Nov.	102	90	12	200	280	75
Dec.	114	160	25	267	450	162
Total	4,211	2,730	15,623	3,243	2,860	12,596

TABLE 40

COLORADO RIVER BASIN

HISTORICAL FLOW AND SEDIMENTATION DATA

For Green River at Green River, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1965			Year		
Jan.	300	300	124			
Feb.	303	540	222			
March	361	2,110	1,034			
April	518	3,300	2,327			
May	819	3,130	3,486			
June	1,207	3,530	5,804			
July	546	3,440	2,555			
Aug.	228	4,510	1,399			
Sept.	189	2,320	596			
Oct.	253	1,120	384			
Nov.	239	360	117			
Dec.	248	420	143			
Total	5,211	2,570	18,191			
	Year 1966			Year		
Jan.	181	200	50			
Feb.	166	150	35			
March	393	5,110	2,730			
April	390	1,090	579			
May	566	1,450	1,115			
June	325	610	269			
July	146	740	148			
Aug.	146	2,200	437			
Sept.	157	2,070	442			
Oct.	193	1,260	332			
Nov.	158	1,660	357			
Dec.	148	4,090	823			
Total	2,969	1,810	7,317			
	Year			Year		
Jan.						
Feb.						
March						
April						
May						
June						
July						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						
Total						

Table 41

Colorado River Basin

Historical Flow and Sedimentation Data

Colorado River near Cisco, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1942		
Jan.	181	300	74
Feb.	166	400	90
March	228	2,200	684
April	1,344	7,000	12,800
May	1,809	2,700	6,650
June	1,961	900	2,400
July	579	600	473
Aug.	185	200	50
Sept.	134	300	55
Oct.	162	260	57
Nov.	186	170	42
Dec.	164	100	21
Total	7,099	2,420	23,396
	Year 1943		
Jan.	153	150	31
Feb.	146	230	46
March	174	260	62
April	709	1,430	1,380
May	996	980	1,330
June	1,365	690	1,280
July	502	580	398
Aug.	368	6,170	3,090
Sept.	212	1,510	435
Oct.	184	250	62
Nov.	215	1,420	417
Dec.	190	170	45
Total	5,214	1,210	8,576
	Year 1944		
Jan.	140	270	52
Feb.	152	440	91
March	166	380	87
April	304	3,830	1,581
May	1,784	3,950	9,582
June	1,843	1,350	3,376
July	677	780	720
Aug.	149	170	35
Sept.	99	170	23
Oct.	159	240	53
Nov.	196	290	78
Dec.	171	100	24
Total	5,840	1,980	15,702
	Year 1945		
Jan.	149	100	20
Feb.	151	540	111
March	178	270	64
April	329	1,450	648
May	1,495	1,270	2,582
June	1,311	320	567
July	676	600	549
Aug.	446	4,560	2,773
Sept.	146	200	41
Oct.	217	890	262
Nov.	224	270	84
Dec.	183	240	58
Total	5,505	1,040	7,759
	Year 1946		
Jan.	174	200	46
Feb.	155	520	109
March	191	390	101
April	525	3,170	2,267
May	726	700	693
June	1,027	1,030	1,438
July	309	320	136
Aug.	196	10,200	2,717
Sept.	135	570	106
Oct.	206	900	253
Nov.	206	700	197
Dec.	208	300	85
Total	4,058	1,470	8,148
	Year 1947		
Jan.	145	400	79
Feb.	151	600	123
March	189	900	232
April	316	2,160	930
May	1,423	2,940	5,697
June	1,594	1,190	2,590
July	985	820	1,092
Aug.	369	4,520	2,274
Sept.	259	1,830	647
Oct.	328	5,230	2,338
Nov.	277	360	136
Dec.	223	440	134
Total	6,259	1,910	16,272

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1948		
Jan.	191	360	94
Feb.	210	2,130	610
March	245	1,350	449
April	830	4,280	4,832
May	1,959	1,580	4,216
June	1,499	670	1,373
July	446	220	133
Aug.	225	2,020	619
Sept.	121	310	52
Oct.	175	310	74
Nov.	204	60	16
Dec.	186	110	28
Total	6,291	1,460	12,496
	Year 1949		
Jan.	188	160	40
Feb.	187	1,530	389
March	243	1,430	474
April	615	2,600	2,181
May	1,289	1,060	1,862
June	1,910	660	1,706
July	908	350	430
Aug.	224	2,840	866
Sept.	158	1,400	301
Oct.	225	1,340	412
Nov.	210	140	41
Dec.	180	120	30
Total	6,337	1,010	8,732
	Year 1950		
Jan.	199	280	76
Feb.	201	650	179
March	209	320	91
April	541	2,040	1,505
May	764	1,010	1,048
June	1,113	690	1,045
July	347	570	268
Aug.	109	150	22
Sept.	138	1,270	239
Oct.	125	130	23
Nov.	161	450	98
Dec.	167	70	16
Total	4,074	830	4,610
	Year 1951		
Jan.	153	100	21
Feb.	151	270	56
March	161	170	38
April	173	340	81
May	758	1,740	1,790
June	1,173	690	1,108
July	530	400	292
Aug.	238	4,930	1,598
Sept.	131	1,110	196
Oct.	169	810	186
Nov.	178	110	27
Dec.	172	430	101
Total	3,987	1,010	5,494
	Year 1952		
Jan.	191	470	123
Feb.	156	730	154
March	194	1,490	394
April	969	3,830	5,047
May	2,152	1,560	4,563
June	2,314	1,010	3,171
July	641	1,230	1,077
Aug.	358	1,040	506
Sept.	213	260	77
Oct.	166	50	11
Nov.	177	50	11
Dec.	188	60	14
Total	7,719	1,440	15,148
	Year 1953		
Jan.	185	50	13
Feb.	142	20	5
March	187	70	17
April	250	630	214
May	606	1,740	1,435
June	1,399	690	1,321
July	353	410	198
Aug.	256	5,770	2,011
Sept.	128	180	32
Oct.	177	5,550	1,340
Nov.	207	640	179
Dec.	171	150	34
Total	4,061	1,230	6,799

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1954		
Jan.	177	170	40
Feb.	143	160	32
March	161	220	47
April	221	610	184
May	436	1,240	735
June	217	290	85
July	150	780	160
Aug.	98	2,060	276
Sept.	171	7,510	1,752
Oct.	215	3,280	962
Nov.	164	690	154
Dec.	140	240	46
Total	2,293	1,430	4,473
	Year 1955		
Jan.	134	260	47
Feb.	121	510	84
March	198	4,540	1,222
April	321	3,020	1,315
May	752	3,360	3,434
June	689	1,300	1,215
July	214	820	239
Aug.	185	4,710	1,187
Sept.	108	440	65
Oct.	119	40	7
Nov.	169	680	156
Dec.	176	130	30
Total	3,186	2,080	9,001
	Year 1956		
Jan.	155	190	40
Feb.	141	190	37
March	187	1,010	258
April	356	1,850	896
May	1,005	2,130	2,910
June	924	980	1,239
July	172	1,500	352
Aug.	119	4,370	706
Sept.	81	90	10
Oct.	121	380	62
Nov.	165	150	33
Dec.	142	130	26
Total	3,568	1,350	6,569
	Year 1957		
Jan.	164	640	142
Feb.	168	2,100	479
March	167	330	75
April	398	2,610	1,411
May	1,375	2,630	4,920
June	2,859	1,650	6,439
July	1,952	1,360	3,603
Aug.	661	3,990	3,588
Sept.	314	1,790	765
Oct.	292	3,170	1,257
Nov.	300	1,260	513
Dec.	239	90	29
Total	8,889	1,920	23,221
	Year 1958		
Jan.	200	130	35
Feb.	225	460	142
March	254	790	272
April	756	3,750	3,856
May	2,032	2,140	5,904
June	1,560	920	1,962
July	234	180	56
Aug.	109	850	126
Sept.	153	1,060	220
Oct.	155	120	25
Nov.	190	130	34
Dec.	176	50	13
Total	6,044	1,540	12,645
	Year 1959		
Jan.	168	70	16
Feb.	153	90	19
March	150	10	3
April	163	390	87
May	536	1,530	1,114
June	924	1,080	1,362
July	214	130	37
Aug.	160	2,790	604
Sept.	124	880	149
Oct.	250	1,360	464
Nov.	210	1,130	322
Dec.	163	40	9
Total	3,215	960	4,186

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
	Year 1960		
Jan.	164	120	26
Feb.	143	110	22
March	273	3,120	1,160
April	629	2,580	2,205
May	758	990	1,024
June	1,068	710	1,034
July	251	100	33
Aug.	106	120	17
Sept.	117	140	22
Oct.	153	270	57
Nov.	177	160	38
Dec.	165	40	9
Total	4,004	1,050	5,725
	Year 1961		
Jan.	156	30	7
Feb.	140	70	14
March	162	110	24
April	206	590	165
May	677	870	799
June	664	340	307
July	130	230	40
Aug.	138	1,950	366
Sept.	316	5,440	2,340
Oct.	357	2,270	1,101
Nov.	252	150	53
Dec.	197	170	45
Total	3,395	1,140	5,261
	Year 1962		
Jan.	182	520	129
Feb.	261	2,700	957
March	246	540	182
April	1,054	3,260	4,677
May	1,603	1,370	2,984
June	1,400	810	1,548
July	765	790	818
Aug.	206	90	25
Sept.	173	3,260	768
Oct.	262	440	156
Nov.	243	70	24
Dec.	180	100	25
Total	6,575	1,370	12,293
	Year 1963		
Jan.	163	110	25
Feb.	193	990	261
March	219	1,250	373
April	245	1,040	347
May	517	800	561
June	332	470	213
July	114	1,150	178
Aug.	168	6,960	1,591
Sept.	183	4,330	1,078
Oct.	134	450	82
Nov.	179	370	89
Dec.	138	260	48
Total	2,585	1,380	4,846
	Year 1964		
Jan.	132	390	70
Feb.	121	410	68
March	128	120	21
April	214	1,620	473
May	861	4,100	4,804
June	780	950	1,008
July	276	1,010	379
Aug.	241	8,710	2,855
Sept.	153	500	104
Oct.	164	50	11
Nov.	182	90	22
Dec.	181	550	135
Total	3,433	2,130	9,950
	Year 1965		
Jan.	162	200	44
Feb.	140	240	45
March	154	240	50
April	562	4,140	3,168
May	1,272	2,550	4,413
June	1,654	1,270	2,864
July	1,116	2,740	4,163
Aug.	447	2,810	1,707
Sept.	369	1,580	791
Oct.	360	2,070	1,013
Nov.	249	870	295
Dec.	237	430	138
Total	6,722	2,040	18,691

TABLE 41
COLORADO RIVER BASIN
HISTORICAL FLOW AND SEDIMENTATION DATA

For Colorado River near Cisco, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
		Year 1966			Year	
Jan.	200	640	174			
Feb.	169	400	92			
March	278	2,220	838			
April	438	2,240	1,337			
May	697	1,200	1,141			
June	429	410	237			
July	185	250	63			
Aug.	120	200	32			
Sept.	145	650	129			
Oct.	175	230	55			
Nov.	153	110	23			
Dec.	174	4,400	1,041			
Total	3,163	1,200	5,162			
		Year			Year	
Jan.						
Feb.						
March						
April						
May						
June						
July						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						
Total						
		Year			Year	
Jan.						
Feb.						
March						
April						
May						
June						
July						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						
Total						

Table 42

Colorado River Basin

Historical Flow and Sedimentation Data

San Juan River near Bluff, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1941			
Jan.	78	15,880	1,681
Feb.	127	22,930	3,955
March	211	25,270	7,267
April	392	26,270	14,030
May	1,323	23,780	42,830
June	915	9,240	11,510
July	526	6,310	4,517
Aug.	174	24,680	5,839
Sept.	202	36,400	10,390
Oct.	655	42,080	38,890
Nov.	191	4,750	1,236
Dec.	104	2,420	344
Total	4,898	21,390	142,489
Year 1942			
Jan.	81	2,650	293
Feb.	68	2,180	201
March	126	10,870	1,866
April	602	19,600	16,060
May	479	7,730	5,040
June	533	5,950	4,322
July	150	3,000	615
Aug.	51	1,450	100
Sept.	38	2,310	120
Oct.	37	1,680	85
Nov.	39	1,280	68
Dec.	43	2,110	124
Total	2,247	9,460	28,894
Year 1943			
Jan.	43	3,310	195
Feb.	49	3,450	230
March	95	7,320	946
April	293	5,920	2,366
May	332	4,910	2,216
June	254	3,760	1,300
July	106	3,400	490
Aug.	91	13,320	1,652
Sept.	62	16,630	1,410
Oct.	58	3,240	257
Nov.	59	2,500	199
Dec.	51	1,740	121
Total	1,493	5,610	11,382
Year 1944			
Jan.	37	1,420	72
Feb.	49	2,740	182
March	76	6,240	644
April	204	7,910	2,195
May	640	7,210	6,284
June	705	4,810	4,614
July	283	3,440	1,325
Aug.	71	4,840	402
Sept.	66	16,640	1,501
Oct.	75	8,220	842
Nov.	52	2,180	153
Dec.	43	1,380	80
Total	2,291	5,870	18,294
Year 1945			
Jan.	41	1,130	63
Feb.	63	9,730	831
March	72	4,530	442
April	196	9,810	2,623
May	456	7,380	4,580
June	377	5,460	2,800
July	128	3,200	556
Aug.	96	50,850	6,879
Sept.	22	6,100	178
Oct.	62	9,800	827
Nov.	46	2,020	127
Dec.	30	3,540	145
Total	1,589	9,280	20,051
Year 1946			
Jan.	37	2,490	125
Feb.	36	6,960	340
March	47	2,690	172
April	95	4,300	554
May	125	2,580	440
June	204	3,730	1,034
July	63	11,770	1,015
Aug.	75	32,620	3,466
Sept.	44	7,690	462
Oct.	55	4,120	309
Nov.	60	3,720	305
Dec.	46	1,420	88
Total	887	6,890	8,310

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1947			
Jan.	31	1,120	47
Feb.	45	3,700	228
March	51	2,850	200
April	68	2,860	265
May	329	6,840	3,063
June	276	3,210	1,206
July	110	1,880	280
Aug.	294	48,080	19,920
Sept.	124	14,950	2,531
Oct.	207	39,860	11,630
Nov.	77	1,540	161
Dec.	65	4,370	389
Total	1,677	17,500	39,920
Year 1948			
Jan.	52	2,080	148
Feb.	79	9,250	992
March	90	8,570	1,044
April	358	8,030	3,919
May	519	6,630	4,685
June	603	6,900	5,665
July	147	4,380	876
Aug.	86	23,100	2,693
Sept.	36	17,810	861
Oct.	75	22,680	2,313
Nov.	55	21,380	1,600
Dec.	41	4,830	271
Total	2,141	8,610	25,067
Year 1949			
Jan.	63	11,700	1,003
Feb.	74	19,360	1,949
March	152	11,650	2,417
April	338	14,380	6,624
May	503	5,780	3,958
June	748	8,270	8,423
July	342	7,130	3,315
Aug.	90	17,650	2,166
Sept.	41	9,370	527
Oct.	56	7,250	554
Nov.	45	1,600	97
Dec.	35	1,400	66
Total	2,487	9,190	31,099
Year 1950			
Jan.	41	2,010	113
Feb.	49	2,780	184
March	56	2,200	168
April	136	4,150	767
May	169	2,250	520
June	191	3,350	871
July	68	7,410	690
Aug.	15	2,010	40
Sept.	42	18,050	1,026
Oct.	30	1,320	54
Nov.	25	640	21
Dec.	32	470	21
Total	854	3,850	4,475
Year 1951			
Jan.	30	300	12
Feb.	29	650	26
March	34	560	26
April	34	640	30
May	142	3,740	720
June	188	790	203
July	30	200	8
Aug.	49	17,260	1,160
Sept.	45	30,300	1,850
Oct.	35	7,720	370
Nov.	39	7,380	390
Dec.	36	10,490	510
Total	691	5,650	5,305
Year 1952			
Jan.	88	18,380	2,201
Feb.	40	2,720	150
March	87	17,290	2,044
April	453	12,170	7,494
May	618	5,690	4,786
June	769	4,910	5,140
July	238	5,490	1,778
Aug.	83	6,300	715
Sept.	56	31,220	2,397
Oct.	38	3,110	159
Nov.	41	3,490	193
Dec.	43	3,090	183
Total	2,554	7,850	27,240

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1953			
Jan.	42	2,070	119
Feb.	36	1,320	64
March	56	3,160	239
April	107	3,840	561
May	156	3,900	830
June	267	2,510	912
July	77	44,350	4,803
Aug.	71	43,820	4,389
Sept.	12	3,000	49
Oct.	54	22,400	1,642
Nov.	55	6,350	475
Dec.	35	1,560	73
Total	968	10,750	14,156
Year 1954			
Jan.	32	1,400	62
Feb.	36	1,360	66
March	48	5,730	374
April	113	4,920	755
May	218	4,660	1,381
June	120	2,800	456
July	120	27,750	4,523
Aug.	66	15,690	1,407
Sept.	89	36,410	4,588
Oct.	95	19,150	2,488
Nov.	39	1,090	58
Dec.	35	1,510	71
Total	1,011	11,800	16,229
Year 1955			
Jan.	31	1,160	48
Feb.	34	2,640	122
March	63	7,080	607
April	62	4,010	341
May	186	6,660	1,689
June	208	4,640	1,314
July	65	20,960	1,848
Aug.	143	51,750	10,410
Sept.	28	6,700	251
Oct.	25	1,730	58
Nov.	31	1,730	73
Dec.	35	1,840	89
Total	911	13,620	16,850
Year 1956			
Jan.	41	2,270	125
Feb.	34	2,190	101
March	75	7,650	776
April	107	4,710	684
May	241	6,240	2,048
June	203	3,700	1,025
July	31	13,400	572
Aug.	36	60,400	3,033
Sept.	4	1,480	8
Oct.	13	4,970	86
Nov.	30	3,940	158
Dec.	25	2,210	76
Total	840	7,630	8,692
Year 1957			
Jan.	38	5,570	285
Feb.	64	14,190	1,241
March	71	6,200	596
April	171	9,780	2,278
May	327	7,670	3,415
June	786	5,490	5,879
July	566	7,600	5,861
Aug.	364	24,270	12,010
Sept.	142	15,140	2,933
Oct.	150	21,950	4,478
Nov.	141	7,560	1,449
Dec.	88	2,000	239
Total	2,908	10,400	41,164
Year 1958			
Jan.	53	14,010	101
Feb.	119	14,790	2,392
March	159	12,380	2,678
April	413	11,620	6,526
May	742	5,220	5,272
June	507	3,150	2,174
July	74	2,590	261
Aug.	42	22,150	1,265
Sept.	61	17,260	1,432
Oct.	47	5,040	322
Nov.	43	1,540	90
Dec.	36	780	38
Total	2,296	7,220	22,551

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1959			
Jan.	30	510	21
Feb.	31	1,260	53
March	32	760	33
April	39	5,410	287
May	110	3,190	478
June	156	1,950	413
July	18	740	18
Aug.	64	37,070	3,227
Sept.	11	4,080	61
Oct.	92	18,850	2,358
Nov.	82	7,840	874
Dec.	46	2,110	132
Total	711	8,230	7,955
Year 1960			
Jan.	37	2,190	110
Feb.	43	3,470	203
March	260	24,170	8,546
April	336	5,000	2,284
May	285	3,340	1,294
June	382	2,850	1,481
July	92	1,110	139
Aug.	18	2,040	50
Sept.	17	950	22
Oct.	58	15,820	1,248
Nov.	40	1,250	68
Dec.	40	2,540	138
Total	1,608	7,130	15,583
Year 1961			
Jan.	35	880	42
Feb.	41	3,070	171
March	66	3,960	355
April	157	3,970	848
May	285	2,580	999
June	227	1,590	492
July	43	4,260	249
Aug.	87	30,020	3,552
Sept.	109	21,750	3,224
Oct.	98	8,490	1,132
Nov.	72	3,810	373
Dec.	44	400	24
Total	1,264	6,670	11,461
Year 1962			
Jan.	36	370	18
Feb.	94	14,140	1,808
March	73	3,610	358
April	315	4,530	1,939
May	346	2,140	1,007
June	296	1,740	702
July	87	720	85
Aug.	23	160	5
Sept.	26	39,540	1,398
Oct.	104	38,980	5,513
Nov.	45	1,930	118
Dec.	33	220	10
Total	1,478	6,440	12,961
Year 1963			
Jan.	25	410	14
Feb.	39	1,550	82
March	40	1,010	55
April	64	2,530	220
May	95	5,070	655
June	47	670	43
July	15	2,740	56
Aug.	48	35,630	2,326
Sept.	70	39,760	3,785
Oct.	41	19,260	1,074
Nov.	47	4,470	286
Dec.	48	3,970	259
Total	579	11,250	8,855
Year 1964			
Jan.	44	2,470	148
Feb.	30	2,160	88
March	28	1,680	64
April	30	2,210	90
May	103	8,920	1,250
June	121	6,500	1,070
July	114	10,670	1,654
Aug.	131	44,920	8,003
Sept.	56	24,280	1,849
Oct.	37	1,890	95
Nov.	42	2,490	142
Dec.	60	3,730	304
Total	796	13,630	14,757

TABLE 42
COLORADO RIVER BASIN
HISTORICAL FLOW AND SEDIMENTATION DATA

For San Juan River near Bluff, Utah

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
		Year 1965			Year	
Jan.	122	9,510	1,578			
Feb.	120	6,470	1,056			
March	85	6,660	770			
April	165	17,560	3,943			
May	288	22,740	8,910			
June	419	6,050	3,448			
July	295	5,870	2,355			
Aug.	218	35,900	10,650			
Sept.	177	6,570	1,583			
Oct.	190	5,140	1,328			
Nov.	232	5,420	1,712			
Dec.	235	6,610	2,115			
Total	2,546	11,480	39,448			
		Year 1966			Year	
Jan.	198	3,230	869			
Feb.	129	2,070	363			
March	199	6,940	1,878			
April	252	3,020	1,036			
May	267	2,460	894			
June	127	1,810	312			
July	54	6,530	480			
Aug.	44	23,770	1,423			
Sept.	43	12,320	721			
Oct.	95	4,030	521			
Nov.	70	2,030	193			
Dec.	72	7,690	753			
Total	1,550	4,480	9,443			
		Year			Year	
Jan.						
Feb.						
March						
April						
May						
June						
July						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						
Total						

Table 43

Colorado River Basin

Historical Flow and Sedimentation Data

Colorado River at Lees Ferry, Arizona

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1943			
Jan.	330	1,830	822
Feb.	332	2,920	1,321
March	516	6,540	4,595
April	1,450	5,690	11,220
May	2,158	3,770	11,070
June	2,729	4,610	17,130
July	1,429	1,860	3,624
Aug.	793	7,360	7,943
Sept.	448	3,870	2,358
Oct.	378	4,230	2,172
Nov.	456	2,660	1,651
Dec.	395	1,730	928
Total	11,414	4,180	64,834
Year 1944			
Jan.	278	1,230	465
Feb.	344	1,530	717
March	509	3,910	2,709
April	1,027	8,280	11,570
May	3,251	6,820	30,160
June	4,136	3,600	20,260
July	1,782	2,350	5,695
Aug.	417	1,320	748
Sept.	229	640	200
Oct.	342		*3,300
Nov.	384		*750
Dec.	320		*450
Total	13,019	4,350	77,024
Year 1948			
Jan.	406	2,040	1,127
Feb.	458	4,250	2,649
March	645	5,550	4,877
April	1,703	9,280	21,510
May	3,507	5,600	26,740
June	3,339	3,920	17,820
July	980	1,830	2,439
Aug.	531	9,190	6,644
Sept.	230	2,580	807
Oct.	331	4,010	1,804
Nov.	408	6,100	3,386
Dec.	347	1,850	875
Total	12,885	5,170	90,678
Year 1949			
Jan.	337	3,500	1,607
Feb.	361	4,580	2,251
March	706	5,920	5,689
April	1,307	6,660	11,860
May	3,098	5,240	22,110
June	4,419	5,220	31,390
July	2,137	3,930	11,440
Aug.	576	4,320	3,386
Sept.	313	2,290	975
Oct.	509	5,390	3,736
Nov.	473	1,730	1,114
Dec.	368	1,190	598
Total	14,604	4,790	95,156
Year 1950			
Jan.	350	1,630	776
Feb.	398	1,660	900
March	650	2,990	2,649
April	1,217	5,180	8,585
May	1,971	3,960	10,610
June	2,979	3,170	12,840
July	1,377	4,630	8,680
Aug.	422	1,290	743
Sept.	330	5,060	2,275
Oct.	342	1,320	615
Nov.	350	1,090	520
Dec.	415	1,190	670
Total	10,801	3,390	49,863
Year 1951			
Jan.	315	900	384
Feb.	361	1,240	608
March	417	1,070	609
April	531	2,120	1,536
May	1,645	3,920	8,782
June	2,886	3,390	13,300
July	1,357	1,640	3,021
Aug.	787	12,720	13,630
Sept.	411	7,580	4,235
Oct.	412	5,460	3,064
Nov.	445	4,000	2,423
Dec.	333	1,530	696
Total	9,900	3,880	52,288

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1952			
Jan.	476	5,500	3,561
Feb.	379	1,740	896
March	440	2,850	1,708
April	2,267	9,610	29,650
May	5,081	5,120	35,390
June	5,192	3,330	23,550
July	1,573	2,000	4,293
Aug.	821	4,300	4,812
Sept.	542	6,510	4,805
Oct.	369	1,030	519
Nov.	386	1,200	632
Dec.	378	1,240	640
Total	17,904	4,540	110,456
Year 1953			
Jan.	394	1,220	656
Feb.	365	1,140	569
March	458	1,460	908
April	529	1,530	1,101
May	1,047	3,370	4,810
June	2,992	3,540	14,430
July	950	3,090	3,993
Aug.	661	13,020	11,720
Sept.	258	4,110	1,442
Oct.	321	6,010	2,622
Nov.	414	3,240	1,823
Dec.	341	1,650	768
Total	8,730	3,780	44,842
Year 1954			
Jan.	318	1,730	748
Feb.	342	1,770	825
March	393	2,090	1,118
April	546	2,700	2,008
May	1,277	4,340	7,550
June	792	2,360	2,547
July	647	6,360	5,603
Aug.	321	4,000	1,749
Sept.	389	13,530	7,163
Oct.	512	13,540	9,443
Nov.	349	2,100	997
Dec.	278	1,210	459
Total	6,164	4,800	40,210
Year 1955			
Jan.	244	1,110	369
Feb.	243	1,120	370
March	580	8,010	6,321
April	617	4,830	4,060
May	1,570	6,090	13,020
June	1,586	3,750	8,107
July	571	2,660	2,065
Aug.	510	16,030	11,120
Sept.	230	5,450	1,705
Oct.	214	1,130	330
Nov.	275	1,530	573
Dec.	326	1,700	756
Total	6,966	5,150	48,795
Year 1956			
Jan.	373	1,930	980
Feb.	280	1,380	525
March	511	5,100	3,543
April	898	5,780	7,068
May	2,190	5,160	15,370
June	2,594	4,650	16,410
July	557	1,960	1,484
Aug.	356	7,780	3,768
Sept.	166	620	140
Oct.	187	610	154
Nov.	300	2,110	863
Dec.	247	830	280
Total	8,659	4,300	50,585
Year 1957			
Jan.	284	1,450	562
Feb.	323	3,080	1,358
March	499	2,860	1,944
April	828	4,560	5,136
May	2,569	6,140	21,460
June	5,645	4,470	34,350
July	4,015	3,910	21,330
Aug.	1,604	9,080	19,800
Sept.	822	11,630	13,000
Oct.	748	13,030	13,254
Nov.	848	8,490	9,791
Dec.	517	1,870	1,316
Total	18,702	5,630	143,301

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1958			
Jan.	397	1,340	721
Feb.	536	3,930	2,862
March	696	4,200	3,972
April	1,574	7,870	16,845
May	3,992	6,620	35,934
June	3,678	4,620	23,099
July	628	1,000	854
Aug.	286	3,310	1,287
Sept.	320	5,590	2,428
Oct.	311	1,280	543
Nov.	357	1,810	879
Dec.	366	1,570	780
Total	13,141	5,050	90,204
Year 1959			
Jan.	315	1,490	638
Feb.	315	1,140	488
March	344	920	430
April	420	980	558
May	1,025	1,300	1,813
June	1,836	1,020	2,559
July	782	620	661
Aug.	425	9,050	5,231
Sept.	246	3,860	1,291
Oct.	502	4,620	3,151
Nov.	499	3,150	2,141
Dec.	352	580	280
Total	7,061	2,000	19,241
Year 1960			
Jan.	305	630	263
Feb.	318	680	293
March	745	7,750	7,856
April	1,610	3,180	6,953
May	1,564	1,320	2,815
June	2,239	960	2,924
July	647	720	638
Aug.	208	940	267
Sept.	193	1,490	392
Oct.	341	7,140	3,314
Nov.	345	2,440	1,144
Dec.	275	780	292
Total	8,790	2,270	27,151
Year 1961			
Jan.	266	590	212
Feb.	331	1,880	848
March	362	1,600	786
April	567	2,900	2,235
May	1,153	2,240	3,513
June	1,588	1,180	2,545
July	369	1,170	587
Aug.	337	14,710	6,741
Sept.	711	17,860	17,274
Oct.	725	5,910	5,827
Nov.	527	2,750	1,968
Dec.	380	1,510	778
Total	7,316	4,350	43,314
Year 1962			
Jan.	349	1,490	708
Feb.	791	9,060	9,749
March	598	4,030	3,275
April	2,391	6,630	21,547
May	3,633	1,850	9,130
June	2,876	920	3,610
July	1,717	1,160	2,719
Aug.	469	1,050	664
Sept.	315	6,000	2,570
Oct.	539	14,360	10,527
Nov.	428	3,100	1,806
Dec.	333	2,100	951
Total	14,439	3,400	67,256
Year 1963			
Jan.	169	1,860	427
Feb.	369	2,550	1,278
March	188	1,080	276
April	60	40	3
May	62	40	3
June	140	420	81
July	90	330	40
Aug.	62	110	9
Sept.	60	110	9
Oct.	61	100	8
Nov.	60	120	10
Dec.	63	130	11
Total	1,384	1,140	2,155

Month	Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)
Year 1964			
Jan.	71	560	54
Feb.	231	1,100	345
March	388	2,410	1,273
April	771	2,000	2,093
May	319	1,420	616
June	60	20	2
July	60	20	2
Aug.	174	50	12
Sept.	156	10	3
Oct.	268	30	10
Nov.	348	70	31
Dec.	398	80	41
Total	3,244	1,020	4,482
Year 1965			
Jan.	558	310	233
Feb.	515	410	288
March	556	590	448
April	1,222	1,240	2,056
May	2,284	480	1,503
June	2,323	420	1,335
July	727	10	11
Aug.	871	10	12
Sept.	750	10	10
Oct.	659		*10
Nov.	589		*10
Dec.	531		*10
Total	11,585	376	5,926

*Estimated

Table 44

Colorado River Basin

Historical Flow and Sedimentation Data

Colorado River near Grand Canyon, Arizona

Columns for each year: Flow (1,000 A.F.) | Weighted mean concentration (p.p.m.) | Load (1,000 tons)

Month	Year 1941 Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Year 1942 Flow	Conc.	Load	Year 1943 Flow	Conc.	Load	Year 1944 Flow	Conc.	Load	Year 1945 Flow	Conc.	Load	Year 1946 Flow	Conc.	Load
Jan.	434	9,320	5,499	430	620	364	347	430	202	298	380	156	356	420	205	384	500	262
Feb.	515	12,640	8,851	435	750	442	351	640	305	363	670	330	381	1,970	1,021	333	370	166
March	838	18,520	21,110	653	4,300	3,822	580	8,060	6,360	551	4,400	3,299	472	1,730	1,111	514	1,800	1,257
April	1,209	13,930	22,910	2,763	17,820	66,950	1,417	9,140	17,610	1,099	9,660	14,440	804	3,700	4,046	1,016	6,400	8,839
May	4,976	14,000	94,760	3,163	8,430	36,280	2,161	8,420	24,750	3,206	9,210	40,160	2,803	7,890	30,090	1,775	4,670	11,280
June	4,100	7,360	41,020	4,241	5,790	33,400	2,676	6,040	22,000	4,144	5,120	28,870	2,754	3,760	14,100	1,995	4,240	11,500
July	1,753	3,280	7,814	1,345	1,520	2,775	1,459	2,630	5,220	1,854	1,990	5,019	1,732	2,360	5,549	784	3,640	3,878
Aug.	861	16,060	18,810	486	1,340	887	834	7,930	9,000	456	1,000	621	1,071	15,550	22,650	567	21,400	16,500
Sept.	659	16,080	14,410	294	740	296	494	5,460	3,670	251	390	133	394	4,080	2,184	372	11,390	5,760
Oct.	1,904	30,650	79,380	356	1,370	665	408	5,410	3,001	362	4,430	2,183	524	7,700	5,487	419	3,910	2,227
Nov.	953	3,320	4,310	386	690	360	477	1,850	1,199	401	660	359	465	950	600	492	2,000	1,340
Dec.	594	850	688	373	560	285	420	980	560	345	280	133	359	900	441	468	1,430	909
Total	18,796	12,500	319,562	14,925	7,220	146,526	11,624	5,940	93,877	13,330	5,280	95,703	12,115	5,310	87,484	9,119	5,150	63,918

Month	Year 1947 Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Year 1948 Flow	Conc.	Load	Year 1949 Flow	Conc.	Load	Year 1950 Flow	Conc.	Load	Year 1951 Flow	Conc.	Load	Year 1952 Flow	Conc.	Load
Jan.	303	550	228	427	590	341	363	2,840	1,401	358	380	186	326	210	91	593	12,090	9,752
Feb.	371	1,120	563	458	3,090	1,923	374	2,960	1,508	414	1,020	572	366	410	202	396	970	524
March	653	8,430	7,489	669	5,730	5,217	796	8,050	8,713	670	2,440	2,220	429	390	228	435	1,820	1,076
April	785	5,530	5,907	1,732	12,740	30,010	1,337	8,380	15,230	1,192	5,730	9,289	535	1,370	996	2,209	12,020	36,117
May	3,088	8,360	35,119	3,392	8,930	41,200	2,959	7,000	28,180	1,941	5,140	13,560	1,552	4,340	9,156	5,062	7,180	49,452
June	3,233	4,350	19,130	3,358	4,710	21,490	4,303	6,770	39,620	2,925	4,630	18,420	2,800	3,980	15,140	5,203	4,100	29,019
July	1,953	2,050	5,440	1,009	1,450	1,995	2,128	3,810	11,020	1,401	4,390	8,358	1,397	1,550	2,937	1,590	1,690	3,646
Aug.	1,329	27,860	50,360	587	11,300	9,022	632	9,850	8,466	444	920	555	833	11,550	13,080	833	4,180	4,737
Sept.	640	8,430	7,336	242	1,330	437	340	3,640	1,682	343	4,030	1,880	452	9,780	6,013	596	9,350	7,581
Oct.	894	24,750	30,100	336	2,940	1,344	521	5,530	3,919	359	1,020	499	425	6,150	3,554	393	810	434
Nov.	608	1,520	1,261	434	2,200	1,310	488	980	649	355	300	147	466	4,060	2,570	396	410	220
Dec.	490	1,610	1,070	365	790	394	381	330	173	434	410	240	353	950	458	400	550	301
Total	14,347	8,410	164,003	13,009	6,480	114,683	14,622	6,060	120,561	10,836	3,790	55,926	9,934	4,030	54,425	18,106	5,800	142,859

Month	Year 1953 Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Year 1954 Flow	Conc.	Load	Year 1955 Flow	Conc.	Load	Year 1956 Flow	Conc.	Load	Year 1957 Flow	Conc.	Load	Year 1958 Flow	Conc.	Load
Jan.	408	340	190	333	440	198	261	460	162	398	1,940	1,049	343	4,720	2,203	415	430	244
Feb.	378	330	168	353	660	317	269	470	171	310	1,050	442	370	2,830	1,422	536	2,910	2,120
March	478	900	586	424	2,750	1,587	586	8,280	6,596	511	5,430	3,774	541	2,280	1,679	749	4,960	5,048
April	533	860	624	566	3,220	2,478	621	4,800	4,052	878	7,250	8,660	812	3,990	4,411	1,580	10,410	22,376
May	989	3,640	4,894	1,211	5,620	9,253	1,515	7,680	15,818	2,125	8,410	24,290	2,501	8,500	28,930	3,900	7,840	41,559
June	2,932	5,080	20,243	798	2,110	2,294	1,596	6,350	13,777	2,584	8,530	30,000	5,541	6,790	51,141	3,763	4,950	25,321
July	980	4,290	5,723	669	8,910	8,107	618	3,870	3,254	598	1,840	1,500	4,033	4,540	24,884	683	510	471
Aug.	703	13,910	13,296	349	18,580	8,820	668	28,410	25,809	383	9,410	4,900	1,672	11,190	25,457	337	7,200	3,300
Sept.	290	5,410	2,134	415	18,220	10,285	265	6,200	2,233	185	460	115	884	12,150	14,609	379	7,760	4,000
Oct.	325	4,140	1,831	526	14,450	10,341	236	590	191	202	150	41	784	12,930	13,784	346	1,910	900
Nov.	428	2,140	1,246	360	1,300	637	298	1,050	424	325	1,180	520	892	11,220	13,617	385	1,240	650
Dec.	360	520	257	296	700	282	354	1,630	785	274	380	141	537	900	655	388	570	300
Total	8,804	4,280	51,192	6,300	6,370	54,599	7,287	7,390	73,272	8,773	6,320	75,432	18,910	7,110	182,792	13,461	5,810	106,289

Month	Year 1959 Flow (1,000 A.F.)	Weighted mean concentration (p.p.m.)	Load (1,000 tons)	Year 1960 Flow	Conc.	Load	Year 1961 Flow	Conc.	Load	Year 1962 Flow	Conc.	Load	Year 1963 Flow	Conc.	Load	Year 1964 Flow	Conc.	Load
Jan.	334	590	270	348	1,510	713	291	30	11	369	350	174	182	1,030	254	79	110	12
Feb.	326	680	300	353	830	398	353	340	165	832	11,130	12,604	374	640	324	245	860	288
March	365	1,610	800	820	10,220	11,396	379	970	498	610	1,770	1,467	203	470	130	382	4,520	2,350
April	423	410	237	1,650	3,770	8,452	587	2,120	1,693	2,467	10,610	35,599	72	240	24	796	4,690	5,082
May	1,011	2,030	2,786	1,580	1,360	2,931	1,147	3,560	5,557	3,716	2,940	14,851	79	160	17	356	2,990	1,447
June	1,804	2,080	5,096	2,212	1,810	5,435	1,692	2,190	5,044	2,850	1,470	5,704	148	80	17	77	50	5
July	795	620	672	678	590	548	417	1,010	575	1,821	1,180	2,929	108	70	10	84	4,620	528
Aug.	488	16,310	10,825	233	220	69	374	15,150	7,708	512	1,050	730	112	18,990	2,892	287	23,480	9,164
Sept.	271	4,480	1,651	218	820	243	748	20,100	20,445	318	7,030	3,039	122	37,810	6,273	191	4,860	1,262
Oct.	528	5,900	4,239	382	8,920	4,637	772	5,760	6,047	557	11,470	8,691	77	1,770	185	298	910	368
Nov.	569	5,990	4,633	380	850	440	570	2,750	2,132	443	1,750	1,054	76	570	59	371	860	432
Dec.	394	980	526	300	140	57	409	590	327	344	1,000	467	77	120	13	416	1,280	724
Total	7,308	3,220	32,035	9,154	2,840	35,319	7,739	4,770	50,202	14,839	4,330	87,309	1,630	4,600	10,198	3,582	4,450	21,662

TABLE 44

COLORADO RIVER BASIN

HISTORICAL FLOW AND SEDIMENTATION DATA

For Colorado River near Grand Canyon, Arizona

Month	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)	Flow (1,000 A.F.)	Weighted mean concen-tration (p.p.m.)	Load (1,000 tons)
		Year 1965			Year	
Jan.	608	3,270	2,704			
Feb.	539	1,960	1,436			
March	568	3,410	2,638			
April	1,251	6,380	10,864			
May	2,282	3,180	9,860			
June	2,282	1,310	4,074			
July	724	2,290	2,256			
Aug.	879	1,790	2,138			
Sept.	767	1,990	2,080			
Oct.	675	160	144			
Nov.	612	470	393			
Dec.	586	1,370	1,091			
Total	11,773	2,480	39,678			
		Year 1966			Year	
Jan.	529	1,750	1,260			
Feb.	524	340	240			
March	718	1,520	1,488			
April	865	460	547			
May	1,011	400	557			
June	789	200	212			
July	698	180	168			
Aug.	694	230	218			
Sept.	623	910	770			
Oct.	567	870	668			
Nov.	589	30	23			
Dec.	670	2,480	2,263			
Total	8,277	750	8,414			
		Year			Year	
Jan.						
Feb.						
March						
April						
May						
June						
July						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						
Total						

Colorado River Basin
Flow and Quality of Water Records
1941 – 66

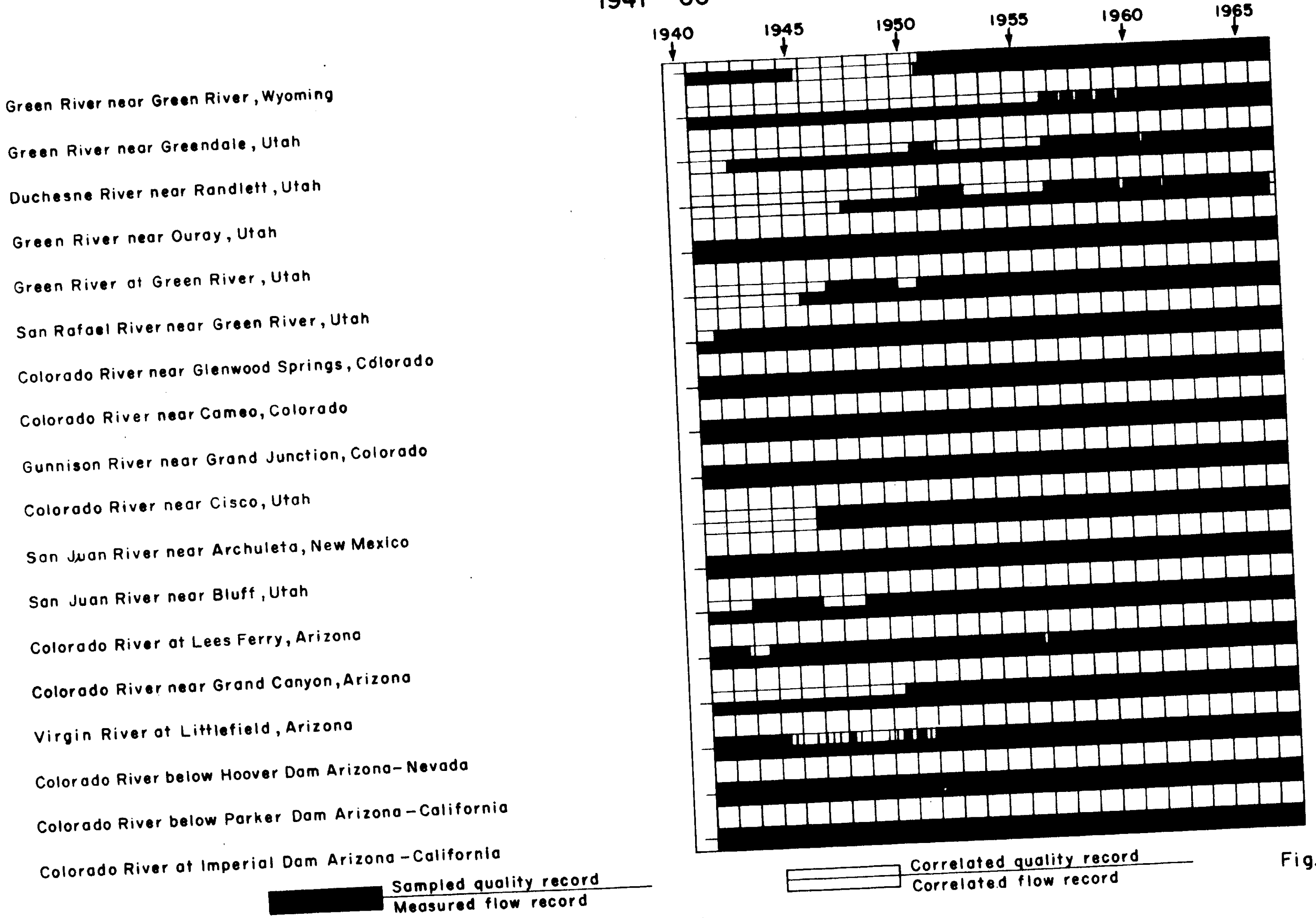

Fig. 12